A COMPREHENSIVE COMPARATIVE LITERATURE REVIEW OF SIDDHA EPISTEMOLOGY (ALAVAI) AND MODERN RESEARCH METHODOLOGY

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ABSTRACT:

Siddha system of medicine, also known as Tamil Medicine, is an ancient Indian Medical System dating back approximately 10,000 years. It encompasses various disciplines and is rooted in fundamental principles. Six *darshanams*, or schools of Hindu philosophy, including *Sangyam, Nyayam, Vaisedigam, Ogam, Mimamsam and Vedandam* originated and flourished in India. The earliest among these is the *Asevagam* tradition, are the pioneers of modern Siddha medicine. Despite the decline of many of these traditions, the philosophical tools they employed continue to inform the Siddha system of medicine, particularly in logic. Siddha medicine has endured as both a practical and scientific medical method, emphasizing rigorous investigation before the use of any action or medicine. This approach reflects a commitment to truth-seeking. Siddha medicines incorporation of quantitative and qualitative methods established a strong connection with modern research principles and concepts. Not only medicine but also the research of truth among the mankind and their sufferings, made Indian sages to get into this. They were also much involved in instruments helping in their research on truth. Here, instruments mean the way of gaining knowledge. The enlightened people named this as "*Pramanangal*". Senses, books all these represents each one of the Instruments. All these devices are considered as the special feature of the research on truth. This research article aims to explore the correlation between the logic (Epistemology - *Alavai* in Tamil) utilized in the fundamental philosophy of Siddha medicine and the research components inherent in modern science.

Keywords: Siddha Fundamentals, Alavai, Epistemology, Research Methodology.

1. INTRODUCTION

Siddha system of medicine, also known as Tamil Medicine, is an ancient Indian medical system dating back approximately 10,000 years.[1] It encompasses various disciplines and is rooted in fundamental principles. Six *Darisanams*, or schools of Hindu philosophy, including *Sangyam, Nyayam, Vaisedigam, Ogam, Mimamsam and Vedandam* originated and flourished in India. The earliest among these is the *Asevagam* tradition, are the pioneers of modern Siddha medicine. Despite the decline of many of these traditions, the philosophical tools they employed continue to inform the Siddha system of medicine, particularly in logic. Siddha medicine has endured as both a practical and scientific medical method, emphasizing rigorous investigation before the use of any action or medicine. This approach reflects a commitment to truth-seeking. Siddha medicines incorporation of quantitative and qualitative methods established a strong connection with modern research principles and concepts. Not only medicine but also the research of truth among the mankind and their sufferings, made Indian sages to get into this. They were also much involved in instruments helping in their research on truth. Here, instruments mean the way of gaining knowledge. The enlightened people named this as "*Pramanangal*".[2] Senses, books all these represents each one of the instruments. All these devices are considered as the special feature of the research on truth. This research article aims to explore the correlation between the logic (Epistemology- *Alavai* in Tamil) utilized in the fundamental philosophy of Siddha medicine and the research components inherent in modern science.

According to Siddhar science, *Alavai* (Epistemology) is about knowing the objects which we could see as well as which are beyond our eye sight like *Kadavul* (God), *Seevan* (Soul) and their subjects *Pasam* (Affection-bonding) by seeing, hearing and understanding them. Of the above said, the inanimate objects could be measured by four methods – *En* (Number), *Nirai* (Weight), *Neetal* (Linear measure), *Mugathal* (Measurement of liquid); whereas the objects which couldn't be seen should be measured and known with the help of books (*Agamangal*) given by *Perarignargal* (great scholars) and by the decision made by the knowledge gained. In the field of research, *Alavai* which could be seen are only used.[3]

2. MATERIALS AND METHODS

Based on Siddha philosophy there are ten types of measuring methods are available. They are

1. *Kaandal* (Observation)
2. *Karudhal* (Inference)
3. *Urai* (Literature)
4. *Inmai* (Non perception)
5. *Oppu/Ubamanam* (Comparison)
6. *Iyalbu* (Natural inference)
7. *Porul* (Presumption)
8. *Olibu* (Inference by elimination)
9. *Unmai* (Fact)
10. *Vazhakku/Idheegam* (Tradition)

The scale developed by the Tamilians is largely aligned with contemporary research methodologies.

Table: 1

S. No	Epistemology Terms In		
	Siddha	***Modern***	***Research Methodology***
1.	*Kaandal* - காண்டல்	Vision	Observation
2.	*Karudhal* - கருதல்	Assumption	Inference
3.	*Urai* - உரை	Composition	Literature
4.	*Inmai* – இன்மை (அபாவம்)	Nought	Non perception
5.	*Oppu/Ubamanam* - ஒப்பு (உபமானம்)	Comparison	Comparison
6.	*Iyalbu* - இயல்பு	Normal	Natural inference
7.	*Porul* - பொருள்	Supposition	Presumption
8.	*Olibu* - ஒழிபு	Elimination	Inference by elimination
9.	*Unmai* – உண்மை	Fact	Reliability
10.	*Vazhakku/Idheegam* - வழக்கு/ஐதீகம்	Myth/ Tradition	-

1. *Kaandal* /Vision – Observational study:

Kaandal refers to the ability to infer the name, type and characteristics of a given object with certainty and without errors. To achieve this, the observation must be free from doubts (*Iyyakkaatchi*), contrasts, and inconsistency in computational observation (*Niruvigalpa Kaatchi*). According to Siddha texts, *Kaandal* is characterized by honest and accurate observation (*Savigalpa Kaatchi*).

If doubts arise about the object, it results in a "doubtful observation," where conclusions about the object are made without thorough investigation, leading to uncertainty about its true nature. If contrasts arise, it leads to a "contrast observation," where the object is perceived incorrectly or mistaken for something else. *Kaandal* can be compared with observational studies in research field.

Observational study[4] - Observational studies involve researchers observing the effects of risk factors, diagnostic tests, treatments, or other interventions without altering who is exposed to them. This method is akin to *Niruvigalpa Kaatchi*. The aim is to gather data as naturally occurring without interference.

Doubtful Observation - this can be compared with observer bias. [5] Observer bias occurs when a researcher's preconceived expectations influence the data collection process. For example, if a researcher is studying the proportion of younger individuals in a public park but overlooks individuals who are dyeing their hair (assuming they are not young, even if they might be), this constitutes observer bias.

Other forms of observer bias include:

- **Confirmation Bias**: Interpreting information to align with existing beliefs.
- **Selectivity Bias**: Using only data that supports the researcher’s hypothesis.
- **Recall Bias**: Memory distortions that affect the interpretation of events.

For instance, if a researcher writes positively about a movie, they haven't seen but have heard good reviews about; their perception might be skewed, affecting their ability to provide an objective assessment. Observer bias, also known as the experimenter effect, can result in misleading information.

The contrast observation can be compared with Type I and II error[6]

Type I Error - False positive

Concluding that an effect exists when it does not. E.g. – A male get pregnancy.

Type II Error – False negative:

Failing to detect an effect when it does exist. E.g., A pregnant woman is not pregnant as by test report.

Both Type I and Type II errors represent inaccuracies in observation and interpretation, similar to how contrast observations might involve incorrect perceptions or misinterpretations of the object.

An honest observation (*Savigalpa kaatchi*) - Descriptive Research:[7]

The term "honest observation" refers to a thorough understanding of five key aspects: name, type, caste, character, and profession, while eliminating any doubts or ambiguities. This concept can be compared with descriptive research. Descriptive research is focused on detailing the characteristics of a population or phenomenon. It aims to answer questions related to "what," "when," and "how" about a specific group or situation. For instance, descriptive studies might investigate questions such as, "What is the average reading ability of five-year-olds when they enter kindergarten?" or "When do children typically begin receiving regular childcare from someone other than their parents?"

Descriptive research does not address the underlying reasons or causes of a phenomenon. However, it provides valuable data that can be used to explore relationship among variables. While descriptive research does not establish causality, it can identify important variables and generate hypotheses for further investigation using more rigorous research designs.

Various data collection methods can be used in descriptive research, either alone or in combination, including surveys, interviews, observations, case studies, and portfolios. Descriptive research can be qualitative, quantitative, or a mix of both approaches.

The way to see, or tool for understanding the vision:

When the soul infers an object, it engages multiple components: one of the five senses (such as vision), its corresponding element (vision corresponds to the fire element), the four intellectual faculties (mind, intellect, will, and ego), the seven *Kaalathigal* (*Kalam, Niyathi, Kalai, Viddhai, Ragam, Mayai, Purudan*) and the five Siva Thattuvas (*Natham, Vindhu,*

Sathakiyam, Esuram, Suddha viddhai). In total, 18 devices (are the internal faculties of the human) are employed in this process.

The tool for understanding the vision can be compared with analysis of Observational data.

In the analysis of observational data, three statistical methods are commonly used across different types of observational studies (Ecological study, Cross-sectional study, Case-control study, and Cohort study):

1. Correlation-Coefficient – is a statistical concept, which helps in establishing a relation between predicted and actual values obtained in a statistical experiment. The value of the correlation coefficient lies between -1 and +1, indicating the strength and direction of the relationship.
2. t-Test – is an inferential statistics is used to determine if there is a significant difference between the means of two groups, assessing how they are related.
3. Odds ratio – is measure quantifies the association between an exposure and an outcome, indicating how the odds of the outcome change with the exposure.

Types of *Kaandal*:

1. *Vayil kaatchi – Indiriya kaatchi*.
2. *Manatha kaatchi*.
3. *Thanvethani kaatchi*
4. *Yoga katachi*.

1. *Indiriya kaatchi* - vision by sense organs - observational study

When the soul's inner knowledge comes into action, it focuses on objects. It uses 5 sense organs (eye, ear, nose, tongue, skin), and associated with corresponding element (Earth, Water, Fire, Air, Space) and also the relevant senses which is the cause of the above said elements. So, in this perception without any doubts or mistakes but this knowledge is general without any look into the object's name, type, group etc., this is known as *Inthiriya kaatchi*. Here the knowledge is attained by means of sense organ.

Indhiriya kaatchi comes under the observational study.

2. *Manatha kaatchi* - Vision by mind – Validity

Manatha Kaatchi, or vision by mind, refers to the process of understanding and differentiating objects through mental faculties after sensory information has been perceived.

This involves integrating and analyzing sensory input with intellectual faculties (Buddhi), allowing for a deeper comprehension of an object characteristics, such as its name and type, based on the knowledge of truth. This vision is distinguished from mere sensory perception as it is primarily a result of mental deed and intellectual processing.

While sensory perception (*Indhiriya Kaatchi*) involves direct knowledge obtained through the senses, *Manatha Kaatchi* involves interpreting and understanding this sensory information through intellectual faculties. For example, diagnosing a disease involves correlating clinical findings (signs and symptoms) with theoretical knowledge, which is an application of *Manatha Kaatchi.*

Validity in research methodology can be compared to *Manatha Kaatchi*. Validity refers to how well a method measures, what it is intended to measure. Just as *Manatha Kaatchi* involves accurately interpreting sensory information through intellectual faculties to understand an objects true nature, as validity ensures that the research method truly reflects the concept being studied. Both concepts emphasize accuracy and the truth of understanding or measurement based on deeper analysis and reasoning.

This comparison highlights the role of intellectual interpretation and accuracy in both *Manatha Kaatchi* and validity.

3. Thanvedhanai kaatchi

Self-suffering feelings refer to the awareness and recognition of one's own experiences of happiness and sadness. This awareness is facilitated by *Sittrarivu,* an innate consciousness or subtle intellect that is always present within the soul. When the soul interacts with various *Thathuvam* (fundamental principles or elements), it undergoes different emotional states. The key *Thathuvam* influencing these experiences include: ***Ragam*** (Attachment or desire), ***Kalam***

(Time), ***Niyathi*** (Destiny or necessity), ***Kalai*** (Art or skill), ***Viddhai*** (Knowledge or wisdom) and ***Mayai*** (Illusion or delusion). These elements shape the soul perception and leads to the experience of joy and sorrow. When the soul is influenced by the *Sathuva* (pure or harmonious) quality, it experiences feelings of happiness, clarity, and peace. Conversely, when influenced by the *Thamasam* (inert or dark) quality, the soul experiences sadness, confusion, and inertia.

Here suffering means Consumption. E.g. It is self-analysing method. Compared with psychological disorders.

4. Yoga kaatchi

While attaining the state of Samadhi, people gain the ability to perceive events happening in distant parts of the external world without moving from their place. This phenomenon is known as *Yoga Kaatchi*. In this divine state (*yoga nilai*), one acquires knowledge without the use of the physical sense organs. It is said that the Siddhars discovered Siddha medicines through this profound state of awareness. This ability can be likened to modern technologies such as CCTV, Skype, Zoom meetings, and video-assisted surgery.

While these scientific techniques provide deep insights into material properties and interactions, they are based on empirical data and computational models rather than intuitive or spiritual insights. They do not align with the concept of yogic vision, despite that, there are so many techniques used to find out or analysis of drugs in research field. For example;

i) Docking study – A computational technique used to predict the optimal orientation of a ligand in the active site of a receptor, aiming to form a stable complex. This technique helps in understanding molecular interactions and drug design.

ii) LC, TLC, GLC, HPLC, UHPLC etc – These are chromatography techniques used to separate, identify, and quantify compounds in a mixture. They help confirm the identity of drugs, provide quantitative results, and monitor therapeutic progress.

iii) SEM-EDAX, XRF, XRD, HR TEM, ICPOES, FTIR etc. – These are analytical techniques used to determine particle size, identify metallic compounds, and analyze material structures. They provide detailed information about the physical and chemical properties of substances.

iv) GC-MS, UV analysis - Gas Chromatography-Mass Spectrometry (GC-MS) and Ultraviolet (UV) spectroscopy are analytical methods used for identifying and quantifying chemical substances and analyzing their molecular structures.

Inmai (Non perception), *Oppu* (Comparison) and *Iyalbu* (Natural interference) comes under observational study;

2. *Inmai* (Non perception) - Cohort study- Retrospective study:

Inami (non-perception) means knowing through nothingness. '*inmai*' means nothing, signifying the understanding that “Without the cold, there can be no snow." This version emphasizes the cause-and-effect relationship in a more concise and evocative way. So *inmai* may compare with cohort study.

Cohort study [8]- ‘look back’ in time contrasting with prospective study which ‘look ahead’ to examine causal associations. In a cohort study, an outcome or disease (effect) – free study population is first identified by the exposure or event of interest and followed in time until the diseases of outcome or interest occurs. Because the exposure is identified before the outcome. Cohort studies have temporal frame work to assess causality and thus have the potential to provide the strongest scientific evidence.

3. *Oppu* (Comparison) – Cross-sectional study

Understanding one thing by relating it to another. For instance, a bison is similar to a buffalo but is much larger and more aggressive. Similarly, in a cross-sectional study, researchers compare different groups or variables at a single point in time to understand their relationships and differences, similar to how a bison and a buffalo are compared to highlight their distinct characteristics.[9]

4. *Iyalbu* (Natural inference) – Case control study

Understanding something based on its inherent nature or characteristics. For example, assessing the appearance of a wound to determine whether it was caused by a weapon, a blow, or fire. It may compare with case control study.

5. *Karuthal* – Inference

Inference refers to the process of understanding or recognizing an object by considering its nature and characteristics.

Table: 2

S. No	Epistemology Terms In		
	Siddha	***Modern***	***Research Field***
1.	*Kanndal / niruvigalap katchi* – காண்டல்/ நிருவிகல்பகாட்சி	Observation/ computational observation	Observational study
2.	*Iyakkatchi* - ஐயக்காட்சி	Doubtful observation	Observer bias
3.	*Thiribu Katchi* - திரிபுக்காட்சி	Contrast observation	Type I and II error
4.	*Savigalpa kaatchi* - *சவிகல்ப காட்சி*	Honest observation	Descriptive Research
5.	*Indhiriya katchi* - இந்திரிய காட்சி	Sense from sensory organ	Observational study
6.	*Manatha katchi* - மானதக்காட்சி	Recollection or Recognition	Validity
7.	*Inmai* - இன்மை (அபாவம்)	Nought - Non perception	Cohort study
8.	*Iyalbu* - இயல்பு	Natural inference	Case control study
9.	*Oppu* - *ஒப்பு*	Comparison	Cross sectional study

Way of understanding or factors of *Karuthal* (Inference).

Methodology –Elements in Conceptual logic:

i) ***Merkol* (proposition)** - There is fire on this mountain.

ii) ***Karanam* (Reason)** - Because there is smoke.

iii) ***Eduthukkattu* (Illustration)** - Where there is smoke there is fire. For example, in a kitchen.

iv) ***Poruthip parthal* (Application)** - There is smoke that continues to rise from this mountain.

v) ***Mudipurai (*Conclusion)** - Hence it is concluded that there is fire on this mountain.

To infer about a given object, the *Merkol (*proposition) is analyzed in three ways:

- ***Pakkam* (State-Position)**: The initial state of understanding. It is an intermediate state between *Subakkam* and *Vibakkam.*
- ***Subakkam* (Real Discrimination)**: Highlighting the object's character when it is evident. Highlighting the truth or support for the inference.
- ***Vibakkam* (Void Discrimination)**: Indicating non-support or absence of the object.When the object's character is not shown or is absent.

To accurately infer the nature of an object, one must examine the *Merkol* (proposition) and determine the *Karanam* (reason) for considering it. Tamil tradition identifies three types of causally cognizable wisdom:

1. ***Iyalbana Karanam* (Natural cause)** - For example, Dawn means the night is over
2. ***Kariya Karanam* (Action Cause)** - For example, Presence of smoke indicates the presence of fire.
3. ***Inmai Karanam* (Non-existence Cause)** - For example, the absence of snow indicates no cold.

When explaining inference, it can be expressed in two ways: through *Udanpattu sol* (affirmative sentences) and *Ethirmarai sol* (negative sentences).

1. *Udanpattu sol* (Affirmative sentences) – These state something positively. For instance, "Where there is smoke, there is fire.”
2. *Ethirmarai sol* (Negative sentences) - These deny something. For example, "Without fire, there is no smoke."

Types of *Karuthal* (Inference)

1. *Than anumanam* (Self-inference) - Understanding concepts for personal purpose.
2. *Pirar anumanam* (Others inference) - Understanding concepts to convey knowledge to others.
3. *Pirathyatcha anumanan* (Experienced inference) - Recognizing through experience, such as detecting the fragrance of a rose based on past experiences.
4. *Anumana anumanam* (Inferred inference) - Drawing conclusions based on the knowledge communicated by someone else.
5. *Agama anumanam* (Traditional inference) - Understanding that current experiences are a result of past karma.

Comparison of Inference with Research Methodology:

- **Proposition (*Merkol*)**: Similar to stating the research hypothesis or objective.
- **Reason (*Karanam*)**: Equivalent to the rationale or background of the study.
- **Illustration (*Eduthukkattu*)**: Comparable to providing examples or evidence in the literature review.
- **Application (*Poruthip Parthal*)**: Similar to applying the research methods or analyzing the data.
- **Conclusion (*Mudipurai*)**: Equivalent to the results and conclusions drawn from the research.

In research, these elements correspond to:

- **Introduction**: Establishing the research question and objectives.
- **Methods**: Detailing the reasoning and methodology used.
- **Results**: Presenting findings and illustrating with data.
- **Discussion**: Applying the results and drawing conclusions.

A hypothesis is a presumptive statement of a proposition that an investigator seeks to prove. It is a condensed generalization that requires knowledge of principles or essential

characteristics pertaining to an entire class of phenomena. When a theory is stated as a testable proposition, clearly and formally, and subjected to empirical or experimental verification, it is known as a hypothesis. The hypothesis provides the foundational basis for the entire investigation and is tested against empirical data.[10]

Hypothesis is divided into several types. They are Simple hypothesis, null hypothesis, alternative hypothesis, causal hypothesis and directional hypothesis.

1. **Simple hypothesis - Natural cause**

It shows a relationship between one dependent variable and a single independent variable. For example, if we eat more vegetables, we will lose weight fasten.

2. **Causal hypothesis - Action Cause**

The causal hypothesis proposes a cause-and-effect interaction between two or more variables.

3. **Directional hypothesis - Non-existence Cause**

It shows how a researcher is intellectual and committed toa particular outcome. The relationship between the variables can also predict its nature. For example, children aged four years eating proper food over a five year period are having higher IQ levels than children not having a proper meal. This shows the effect and the direction of the effect.

4. **Alternative hypothesis - Affirmative sentences**

It is a hypothesis that a random cause may influence the observed data or sample. It states that the research prediction of an effect or relationship. i.e., there is a relationship between the two variables being studied, (one variable has an effect on the other)

5. **Null hypothesis - Negative sentences**

It provides a negative statement and there is no relationship between (Independent and dependent variable) two measured phenomena.

Types of inference may compare with Clinical Trial phase I-IV [8]

1. **Self-inference (*Than Anumanam*) - Clinical Trial Phase I**:
   - **Self-inference** involves understanding concepts for personal or internal purposes, akin to Phase I of a clinical trial, where the primary focus is on the

safety of the treatment within a small group, often to understand its effects on the body.

2. **Others inference (*Pirar Anumanam*) - Clinical Trial Phase II**:
    - **Others inference** relates to understanding concepts to convey knowledge to others, similar to Phase II trials, which aim to determine the effectiveness of a treatment and share the findings with a broader audience through more extensive testing.
3. **Experienced inference (*Pirathyatcha Anumanam*) - Clinical Trial Phase III**:
    - **Experienced inference** is about recognizing or validating through experience, just as Phase III trials validate the treatment's efficacy in a large and diverse population, gathering extensive data through experienced observation.
4. **Inferred inference (*Anumana Anumanam*) - Clinical Trial Phase IV**:
    - **Inferred inference** involves drawing conclusions based on the knowledge from others, comparable to Phase IV, where ongoing studies and post-market surveillance are used to infer long-term effects, drawing from broader data.
5. **Traditional inference (*Agama Anumanam*) - Observational Studies / Real-World Evidence**:
    - **Traditional inference** relates to understanding current experiences as a result of past events or karma. This can be compared to observational studies or real-world evidence in research, where long-term outcomes and historical data are used to infer the effectiveness or risks of a treatment over time.

Thus, the process of *Karuthal* (Inference) can be effectively compared to the structured approach of a research article using the IMRAD (Introduction, Methods, Results, and Discussion) format. Each type of hypothesis in research methodology can be compared to a corresponding type of logical inference, demonstrating the fundamental connection between reasoning and scientific investigation. These comparisons illustrate how hypotheses guide the process of drawing conclusions in research, similar to how logical inference guides understanding in other areas of knowledge. This comparison helps align the traditional concepts of inference in Siddha with modern research methodologies, particularly in clinical trials.

Olibu (Inference by elimination), and *Porul* (Presumption) comes under *Karudhal* (Inference).

6. *Olibu* (Inference by elimination)

This refers to the process of understanding something by eliminating other possibilities. For example, among Raman and Krishnan, if it is known that Raman is genuine and Krishnan is not, one can infer that Krishnan is the person who stole the object and placed it there. This is akin to knowing that "this is that, not the other."

7. *Porul* (Presumption)

A Tamil proverb states, "If there is a good person in this world, the rain that falls for his goodness will benefit everyone." This implies that not everyone is good, and by extension, recognizes the existence of non-good people as well.

***8. Urai – Agamam* – Literature**

This is the sayings of the great saints and enlightened people.,things which cannot be seen or felt is said with full surety in this *aagama anumaanam.*

In modern aspect of research methodology *Urai* may compare with literature.

A literature review[8] is survey of scholarly sources (such as books, journal, articles and thesis) related to a specific topic or research questions. It is often written as part of a thesis, dissertation or research paper in order to situate the work in relation to existing knowledge.

Purpose:

The purpose of ROL is to gain an understanding of the existing research and debates relevant to a particular topic or area of study and to present that knowledge in the form of a written report.

Poli – Errors:

If there is going to be any mistake in the parts of *karuthal* (such as Proposition, Reason, Illustration, i.e., *pakkam, Karanam, Eduthukkattu* respectively) that is called “poli”. While in an argument, both speaking in a daze and not speaking due to not knowing how to speak are called failure. If there is any mistake in this Epistemilogy, there is going to be mistake in the thing which is measured too. So, it is necessary to know and remove all errors. In Siddha aspect there are 65 types of *poli* (errors) are there.

In modern aspect “*Poli*” can be compared with Errors.

Errors[8] in length are differences between the target's true value and the measured value or between the reference value and the measured value. They are expressed as 'Error = Measured value - True value.

Table 3

S. No	Epistemology Terms In		
	Siddha	*Modern*	*Research Field*
1.	*Karuthal* - கருதல்	Inference	Inference
2.	*Merkol* - மேற்கோள்	Proposition	Aim and Objective
3.	*Karanam* - காரணம்	Reason	Hypothesis
4.	*Eduthukkattu* - எடுத்துக்காட்டு	Illustration	Literature Review
5.	*Poruthip parthal* - பொருத்திப்பார்த்தல்	Application	Materials and methods
6.	*Mudipurai* - முடிப்புரை	Conclusion	Conclusion
7.	*Iyalbana Karanam* - இயல்பான காரணம்	Natural cause	Simple hypothesis
8.	*Kariya Karanam* - காரிய காரணம்	Action Cause	Causal hypothesis
9.	*Inmai Karanam* - இன்மை காரணம்	Non-existence Cause	Directional hypothesis
10.	*Udanpattu sol* - உடன்பாட்டுச்சொல்	Affirmative sentences	Alternative hypothesis
11.	*Ethirmarai sol* - எதிர்மறைச்சொல்	Negative sentences	Null hypothesis
12.	*Than Anumanam* - தன்னனுமானம்	Self-inference	Clinical Trial Phase I
13.	*Pirar Anumanam* - பிறர் அனுமானம்	Others inference	Clinical Trial Phase II
14.	*Pirathyatcha Anumanam* - பிரத்தியட்ச அனுமானம்	Experienced inference	Clinical Trial Phase III
15.	*Anumana Anumanam* - அனுமானஅனுமானம்	Inferred inference	Clinical Trial Phase IV
16.	*Agama Anumanam* - ஆகம அனுமானம்	Traditional inference	Observational Studies
17.	*Urai/Agamam*-உரை/ஆகமம்	Literature	Literature review
18.	Poli	Errors	Error

3. SUMMARY AND DISCUSSION:

The content of *Kaandal* explores the parallels between Siddha concepts of vision and modern research methodologies, particularly observational studies. Siddha's terms *Kaandal, Inmai, Oppu, and Iyalbu*—are compared with different observational study methods like cohort, cross-sectional, and case-control studies. The concept of *Karuthal (*Inference) and its comparison with research methodology involves understanding or recognizing an object by evaluating its nature and characteristics. It is structured around a methodological approach similar to the IMRAD format in research. Poli (Errors) in *Karuthal* refers to mistakes or inaccuracies in the inference process, similar to errors in research measurements.

4. CONCLUSION:

The comparison between Siddha Epistemology and Research methodology reveals a striking alignment, demonstrating how ancient practices of observation and inference parallel contemporary scientific methodologies. The summary and discussion emphasize the deep connection between traditional wisdom and modern research, showing how both approaches aim to achieve accurate understanding and knowledge through systematic observation and analysis. This illustrates the timeless and universal nature of inquiry and knowledge acquisition across cultures and eras. This synthesis underscores the universal nature of inquiry and knowledge, bridging traditional wisdom with modern science.

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CONFLICT OF INTEREST

The authors have no conflict of interest.

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