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Research paper

Dermatological Ailments Treated by the Non-Institutionally Trained Siddha Practitioners of Virudhunagar District, Tamil Nadu, India

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ABSTRACT

Dermatological conditions are a significant yet often underestimated global healthcare concern, with increasing prevalence rates worldwide. In India, traditional medicine systems such as Siddha offer alternative treatments for skin ailments. This study aims to document the knowledge and practices of non-institutionally trained Siddha practitioners in Virudhunagar district, Tamil Nadu, focusing on their treatment of dermatological issues. Ethnobotanical data were collected from 63 practitioners using interviews conducted in Tamil, and plant species used in treatments were identified and analyzed. The study documented the use of 100 plant species in 60 medicinal formulations for treating various dermatological conditions, with a species accumulation curve indicating sufficient sampling. Illness categories such as wounds, psoriasis, and eczema showed the highest informant consensus factor (Fic), while formulations involving plants like *Thespesia populnea, Terminalia chebula*, and *Curcuma longa* had strong support from traditional literature. However, several plant-based treatments lacked documentation in Siddha Materia Medica, reflecting gaps in recorded knowledge. The findings highlight the rich traditional knowledge of non-institutionally trained Siddha practitioners and underscore the importance of integrating such practices into community healthcare. Further research is recommended to explore the pharmacological potential of the documented plant species and promote the conservation of ethnomedicinal knowledge.

1. Introduction

Dermatological issues are often underestimated as a global healthcare concern (Sun et al., 2019). Between 1990 and 2017, the age-standardized prevalence rates of dermatological conditions increased by 8.22% and 14.96%, respectively (Mascarenhas et al., 2012). According to the United Nations Department of Economic and Social Affairs, there has also been a reported global decline in dermatological rates (Anonymous, 2019). Although precise statistics on the

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prevalence of dermatological conditions are unavailable, it is estimated that approximately 1.79% of the global population is affected (Agarwal et al., 2015), with around 48.5 million people affected in 2010 alone. In India, the prevalence of dermatological issues was estimated at 1.85%, driven by factors such as diet, working conditions, living standards, and employment status (Ganguly & Unisa, 2010).

Pharmacological interventions aimed at addressing dermatological conditions have largely focused on improving food production, treating skin ailments, optimizing dermatological and follicle-stimulating hormone levels, and normalizing gastrointestinal functions (Dabaja & Schlegel, 2014). Treatments for dermatological disorders have included the use of dermatological modulators, dopamine agonists, aromatase inhibitors, and metformin. Non-pharmacological interventions, such as counseling, lifestyle modifications, and assisted dermatological technologies, have also been employed (El-Khatib et al., 2019). Despite the widespread use of over-the-counter supplements for dermatological conditions, their usage remains poorly documented (Palmsten et al., 2018).

Dermatological conditions often intertwine with psychological and social issues, with a noticeable global gender disparity in their prevalence. In many cases, dermatological problems are not prioritized as critical health concerns (Agarwal et al., 2015), remaining a burden predominantly on affected individuals (Inhorn & Patrizio, 2015). In India, cultural and social factors—including social stigma, the cost of medical care, lack of awareness, limited access to healthcare, and a preference for traditional medicine—heavily influence health-related decisions. Various plants have historically been used to maintain dermatological health (Lohiya et al., 2016); however, their usage patterns and overall impact are poorly documented. While traditional Siddha texts describe the types and causes of dermatological problems, there is increasing interest in using Siddha medicine for skin conditions in Tamil Nadu due to its perceived safety and affordability.

Siddha is a recognized traditional system of medicine in India, particularly for the treatment of dermatological ailments. While it shares similarities with Ayurveda, Siddha is primarily practiced in Tamil Nadu and its neighboring regions, as well as in Sri Lanka and Malaysia. According to Siddha doctrine, the human body is composed of 96 tattuvam (principles), among which three—Vaḷi (air), Aḻal (heat), and Aiyam (water)—are considered most essential. An imbalance among these elements is believed to cause illness (Muthiah et al., 2019). Treatment aims to restore balance (Kiran et al., 2020). Traditional diagnostic methods include examining the pulse, touch, speech, eyes, tongue, urine, and feces. However, due to its limited geographic distribution and the predominantly Tamil-language literature, Siddha medicine is not widely known in the global scientific community. It gained recognition as a distinct system of traditional medicine only after 1920, with institutionalization efforts beginning in 1960. Non-institutional training has also existed within this system, with many traditional remedies remaining undocumented. We hypothesize that non-institutionally trained Siddha practitioners have played a significant role in the treatment of dermatological conditions. Therefore, documenting and analyzing their knowledge could offer valuable insights for improving community healthcare.

While sporadic explorations have qualitatively documented the ethnobotany of Virudhunagar district (Ravikumar & Sankar, 2003; Ravishankar, 2007; Kumar & Kumar, 2011; Disticraj & Jayaraman, 2015; Manimaran & Murugesan, 2017), these studies primarily focused on tribal medicine. Similarly, limited documentation exists regarding local knowledge of dermatological healthcare in Tamil Nadu (Rajeswari & Murugesh, 2019; Balamurugan et al., 2018). This study aims to quantitatively document and analyze the traditional knowledge of non-institutionally trained Siddha practitioners in Virudhunagar district, Tamil Nadu, regarding their treatment of dermatological conditions.

2. Methodology

2.1 Study Area

Virudhunagar district, located in southern Tamil Nadu, India, was established in 1985 after the bifurcation of Ramanathapuram district. The district comprises two revenue divisions and four taluks, with a total population of approximately 1.94 million and a balanced female-to-male ratio of 1.007:1. The population density is around 458 people per square kilometer, indicating a relatively dense demographic distribution.

Rural inhabitants constitute about 49.53% of the district's total population, highlighting the prominence of agriculture and traditional lifestyles in the region. The healthcare infrastructure is well-developed, consisting of 11 hospitals, 58 Primary Health Centers (PHCs), and 245 health sub-centers. Of these, five hospitals and 11 PHCs offer Siddha treatment, indicating the integration of traditional medicine within the district's healthcare system.

Previous ethnobotanical surveys have documented a strong local preference for Siddha formulations in treating various ailments, illustrating the cultural significance of this traditional practice. The availability of modern medical services alongside Siddha treatments provides a comprehensive healthcare approach, especially in rural areas where access to healthcare may be limited. The prevalence of Siddha medicine reflects the district's rich cultural heritage and the community's trust in traditional healing methods.

This study was conducted in Wattrap, Srivilliputhur taluk of Virudhunagar district, located between 11°00′ and 12°00′ N latitude and 77°28′ and 78°50′ E longitude. Data collection involved interviews with non-institutionally trained Siddha practitioners, identified through discussions with community elders and the 'Siddha Medical Practitioner (SMP)' association in Virudhunagar district. Practitioners were randomly selected, and their knowledge of medicinal plants was documented with prior consent. Interviews were conducted in Tamil, following the International Society for Ethnobiology's (ISE) Code of Ethics for ethnobiological research (2006). The successive free-listing method (Heinrich et al., 2009) was employed to gather information on plant names, parts used, preparation methods, modes of application, and treated symptoms. Medicinal plants cited by the informants were collected at their reproductive stage, and herbarium specimens were prepared, dried, and taxonomically identified using regional floras (Gamble & Fischer, 1921; Henry et al., 1987; Matthew, 1981, 1999; Nair & Henry, 1983).

2.2 Interviews

The knowledge of non-institutionally trained Siddha practitioners regarding dermatological ailments was documented between July 2021 and April 2022 using the successive free-listing method (Heinrich et al., 2009; Leonti & Weckerle, 2015). Practitioners were identified through interviews with elderly community members and snowball sampling. Practitioners with more than five years of experience in treating dermatological conditions were included in the study, regardless of age, gender, education, or residence. Before conducting formal interviews, prior informed consent was obtained by explaining the study's purpose, and rapport was established with the informants (Heinrich et al., 2018). The study adhered to the ISE Code of Ethics (2006) and was approved by the Institutional Ethics Committee.

In total, 63 non-institutionally trained Siddha practitioners were interviewed over 83 field days. The interviews were guided by a questionnaire divided into two sections. The first section gathered demographic information, including age, gender, education, experience, residence, source of income, mode of traditional medicine training, and preparation methods. The second section focused on documenting local knowledge regarding medicinal formulations used to treat dermatological ailments. Detailed information about the illnesses treated, ingredients used, preparation methods, dosage, and duration of treatment was collected.

Additionally, the survey recorded the demographic details of patients seeking dermatological treatment from these practitioners. Data such as age, years after marriage, family income, medical expenses, and duration of treatment at the time of the interview were noted. The interviews were conducted in Tamil and later translated into English.

2.3 Specimen Collection

During the interviews, practitioners were asked to show the plants or plant parts used in their formulations. Representative samples were collected during field visits, herborized following the method described by (Ahern et al 1977), and identified by comparing voucher specimens. Binomial names were assigned using local floras (Gamble, 1997; Nair & Henry, 1983; Henry et al., 1989, 1987) and confirmed with the website "The Plant List" (http://www.theplantlist.org/). All collected plant specimens and raw drugs were stored at the herbarium of the Xavier Research Foundation, St. Xavier's College, Tirunelveli.

2.4 Data Analysis

The equivalent English terms for the illnesses were determined through consultation with an institutionally trained Siddha physician. General entries related to dermatological conditions were categorized under "Dermatological (general)." Data on medicinal plants were converted into use-reports (UR) following previously established methodologies (Chellappandian et al., 2012). Claims documented in the Siddha system of medicine for similar illness categories were identified using the Siddha pharmacopeia (Mudaliar, 1936).

The sufficiency of the survey sample was assessed by plotting Shannon-Wiener's index against the cumulative number of URs. A clear asymptote in the curve was considered an indicator of sufficient sampling. Informant consensus on treating illnesses was measured using the Informant Consensus Factor (Fic), calculated with the formula:

$$F_{ic} = (N_{ur} - N_t)/(N_{ur} - 1)$$

Where Nur represents the number of URs for a particular illness category, and Nt is the total number of species mentioned for that illness. The Fic value ranges from 0 to 1, with higher values indicating a greater consensus among informants.

To evaluate the importance of individual species within each illness category, the Index of Agreement on Remedies (IAR) was calculated using the formula:

$$IAR = (n_{ur} - n_a)/(n_r - 1)$$

Where nur is the total number of URs for a given species, and na is the number of illness categories treated with that species.

The illness categories were then classified into three groups, following a modified version of the method proposed by Moerman (2007) and Pandikumar et al. (2011). Illness categories with Fic values greater than or equal to the mean ± SD of all illness categories were considered as "categories with high consensus." Categories with Fic values less than or equal to the mean ± SD were classified as "categories with low consensus." The remaining categories were classified as "categories with average consensus." The reported uses of individual species were compared with entries in the Siddha Materia Medica (Mudaliar, 1936), and important traditional claims were discussed in detail.

3. Results

3.1 Demographics of Healthcare Providers

Most healthcare providers were aged between 30 and 60, with experience ranging from 5 to 30 years. The primary source of their traditional knowledge came from learning under mentors (Gurus). Only 9.23% of the providers had formal collegiate education. A significant portion of these healers practiced in rural areas (60%), and many did not rely entirely on their medical practice as a primary source of income. Approximately 38.47% of healthcare providers prepared medicines themselves, while the remainder depended partially or entirely on pharmaceutical industries for medicinal supplies.

3.2 Demographics of Health Seekers

The majority of individuals seeking treatment for dermatological issues were aged between 5 and 40. Most sought help after experiencing symptoms for 3-5 years, particularly those with food-related problems. The healthcare providers did not charge a consultation fee, but most health seekers spent about 7% of their monthly income on medications. A large proportion (88.52%) of the patients continued treatment for approximately 3 months.

3.3 Local Knowledge on Treating Dermatological Issues

This study documented the traditional knowledge of non-institutionally trained Siddha practitioners in Virudhunagar district regarding the treatment of dermatological problems. The species accumulation curve confirmed that the sample size was sufficient. The study recorded the use of 100 plant species, including their local names, parts used, and the illnesses treated. Of these species, 48 (63.15%) were used to treat both dermatological and other conditions, while the remaining species were exclusively used for either dermatological or other ailments. These plants were utilized to prepare 60 medicinal formulations, with details on ingredients, preparation methods, dosages, and the illnesses treated provided in Supplementary Of these formulations, 67 (18.059%) were for treating one specific set of conditions, while 38 (10.243%) were intended for other conditions.

3.4 Illness Categories in Dermatological Issues

In this study, 100 plant species were reported to treat various dermatological ailments. The data yielded 287 claims and 371 unique reports (UR). Of these, 84 claims (30.95%) and 67 URs (18.05%) were mentioned in the Siddha Materia Medica. Among the claims not documented in the Siddha Materia Medica, 26 (30.95%) were singletons. Illness categories like wounds, psoriasis, and eczema had the highest number of URs (18.05%), while categories such as burns (2.96%), cut wounds (2.965%), and vitiligo (5.391%) had fewer URs.

3.4.1 Illness Categories with High Consensus for Dermatological Issues

One illness category, broadly termed "dermatological," had a high Fic value, exceeding the average Fic plus the standard deviation. Plant species such as *Thespesia populnea*, *Terminalia chebula*, and *Curcuma longa* were highly cited, with strong support from traditional literature. Additionally, *Cocos nucifera* oil, *Acalypha indica*, and *Cullen corylifolium* rind were used for treating dermatological conditions, although these uses were not mentioned in the Siddha Materia Medica.

3.4.2 Illness Categories with Average and Low Consensus for Dermatological Issues

Twenty-nine illness categories, including "dermatological (general)," wounds, psoriasis, eczema, alopecia, and allergies, had average Fic values. Two categories, eczema and wounds, had low URs and little consensus. In the "dermatological (general)" category, species like *Aristolochia bracteolata* leaves and *Clitoria ternatea* were frequently mentioned, with support from traditional literature. Similarly, the leaves of *A. indica* and *Curcuma longa* had high URs but lacked traditional literature support. Various plant species, including *Cynodon dactylon, Enicostema axillare, Aloe vera, Azadirachta indica*, and others, were cited for treating wounds, psoriasis, eczema, alopecia, and allergies, with or without traditional literature backing.

3.5 Illness Categories for Dermatological Issues

In total, 100 plant species were reported for treating dermatological ailments, 26 (30.95%) of which were listed in the Siddha Materia Medica for the same illnesses. The data produced 287 URs and 371 claims, of which 67 (18.05%) were singletons. Furthermore, 38 URs (10.24%) and 24 claims (6.46%) had traditional literature support, while only 19 claims (5.12%) were singletons. Dermatological issues were the predominant category, accounting for 63.15% of the URs, followed by burns (2.96%).

3.5.1 Illness Categories with High Consensus in Dermatological Issues

The "dermatological (general)" category had a Fic value higher than the average Fic plus the standard deviation. In this case, species like *C. nucifera* seeds, *A. indica* (documented in the Siddha Materia Medica), and *C. corylifolium* (not documented in the Siddha Materia Medica) were highly cited.

3.5.2 Illness Categories with Average Consensus in Dermatological Issues

The "dermatological" category received the highest number of URs, with 67 (18.05%), and various plant species and parts were frequently cited for different conditions. Similarly, other illness categories had different plants and species with varying UR and IAR values.

The analysis of F_ic values across 29 dermal ailment categories treated by non-institutionally trained Siddha practitioners in Virudhunagar district, Tamil Nadu, reveals varying degrees of consensus on plant usage (Fig. 1). Ailments such as acne, athlete's foot, and chronic wounds show minimal agreement, with F_ic values close to zero, indicating diverse or experimental treatment practices among practitioners. Conditions like allergies and dandruff also exhibit no consensus, suggesting that these ailments are either not traditionally treated using Siddha practices or that plant species used are highly variable.

In contrast, certain ailments such as eczema, psoriasis, and wounds display relatively higher F_ic values, indicating stronger consensus on treatment practices. Eczema, in particular, has the highest F_ic value (0.027), reflecting significant agreement among practitioners in both prescribed and non-prescribed treatments. Psoriasis and wounds follow with moderate F_ic values, highlighting consistent use of medicinal plants across different treatment categories for these ailments. These higher values suggest that traditional knowledge and established Siddha remedies

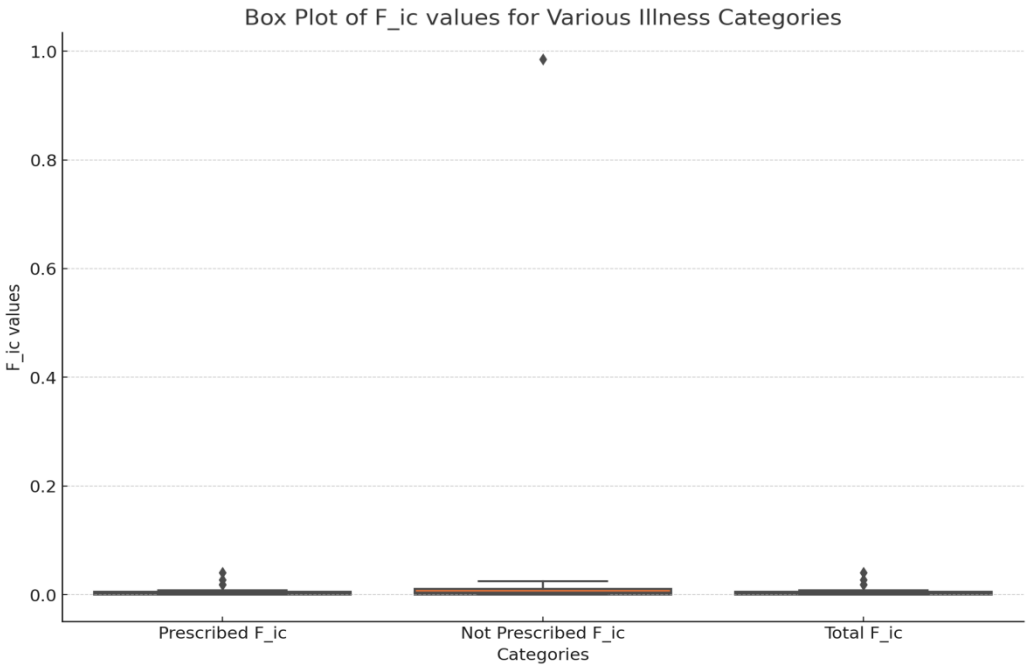

Fig. 1 The box plot showing the distribution of F_ic values across the categories of illnesses prescribed in Siddha Materia Medica, those not prescribed, and the total F_ic values. The plot illustrates the spread of values, highlighting how the data is dispersed and identifying any outliers across the different illness categories

remedies play a more central role in treating these conditions.

Interestingly, for ailments like diabetic ulcers, vitiligo, and gangrene, moderate F_ic values were observed, primarily in non-prescribed treatments, indicating that while Siddha Materia Medica may not cover these conditions comprehensively, practitioners still rely on certain plant species to manage them. Overall, the study reveals a mixture of traditional and innovative approaches to treating dermal ailments, with some conditions showing strong adherence to prescribed remedies, while others reflect a broader experimental use of medicinal plants.

4. Discussion

Previous studies have extensively documented the use of medicinal plants in various cultures for treating dermatological issues (Van Andel et al., 2012; Moteetee & Kose, 2016; Adhikari et al., 2018; Jaradat & Zaid, 2019; Prescott & Khan, 2020). Notably, the medicinal properties of plants in relation to skin conditions have attracted considerable interest (Abdillahi & Van Staden, 2012; Kumar et al., 2012). This research focuses on recording the practices of non-institutionally trained Siddha practitioners in Virudhunagar district, Tamil Nadu, India, specifically for treating dermatological problems. Unlike European systems of traditional medicine, South Asian healing practices, particularly in non-institutional settings, tend to be patriarchal (Abraham, 2020). Earlier surveys conducted in different regions of Tamil Nadu also show that non-institutional traditional medicine is dominated by male practitioners (Pandikumar et al., 2011; Mutheeswaran et al., 2011; Chellappandian et al., 2012). While women often have knowledge of treating common ailments, their roles as healers in society remain limited. This highlights the importance of conducting more in-depth studies that not only focus on medicine but also explore the social aspects of dermatological treatments in traditional settings.

The Guru-Shishya tradition (mentor and mentee) has long been the primary method of teaching in ancient India, where knowledge is passed down through close, direct interaction. This study confirms that learning from Gurus remains the dominant form of knowledge transmission among non-institutionally trained Siddha practitioners in Virudhunagar. Many of these healers rely on proprietary formulations that they prepare themselves. In India, childlessness and healthcare options are shaped by various cultural and social factors, with women disproportionately affected (Sheoran & Sarin, 2015). Although artificial reproductive technologies have advanced, they remain costly and are primarily accessible in urban areas. The findings of this study show that most healthcare providers in Virudhunagar are based in rural areas, offering consultations free of charge. Around 60% of patients spend only 7% of their

monthly income on medicines. The accessibility and affordability of these services are key reasons people turn to non-institutionally trained Siddha practitioners for dermatological treatments. Singh and Madhavan (2015) also suggested that traditional healing systems provide cost-effective care with high accessibility.

In this study, dermatological conditions received more unique reports (UR) and claims than eczema and other dermatological ailments. Siddha Materia Medica supported a smaller percentage of these claims. Although descriptions of eczema and other dermatological ailments exist in Siddha literature, they are underrepresented, as these texts were created during the institutionalization of the Siddha system (Venugopal, 1968). Eczema and dermatological ailments were highly cited in this study, with tannin-rich plant species being associated with their treatment. Hemostasis is considered a management method for these conditions (James, 2016), and the use of astringents has been documented (Livdans-Forret et al., 2007). *A. indica* has been used in Iranian traditional medicine to treat eczema, and some clinical evidence supports its efficacy (Goshtasebi et al., 2015). *A. indica* holds cultural and religious significance in India and other cultures and has been used for treating eczema and related skin conditions (Ugwah-Oguejiofor et al., 2011; Zaid et al., 2018). *C. longa* has also been used for dermatological issues (Fahmy et al., 2018), and there is preclinical evidence suggesting the estrogenic effects of *T. chebula* (Mangathayaru et al., 2014). Studies have shown a link between a balanced diet, protein intake, and skin health (Silvestris et al., 2019), though the validity of these traditional claims needs further investigation.

T. chebula is highly valued in Indian traditional medicine for treating eczema, but there are limited scientific studies validating this claim (Geeta et al., 1995; Tomar et al., 2017; Swar et al., 2017). In dermatological treatments, *Acalypha indica* juice has been shown to reduce symptoms (Esmaeilinezhad et al., 2019). Smilax china and *A. indica* have also been used for skin conditions, but *Curcuma aromatica* has more substantial supporting evidence (Akour et al., 2016). Many other claims either lack scientific validation or have only sporadic support. A small clinical study involving 20 participants with dermatological conditions (<15 million/ml) showed that treatment with *A. indica* bulbs over two months improved skin health and quality (Varsakiya et al., 2016). There is clinical evidence supporting the use of *C. dactylon* (Gupta et al., 2011) and *Datura innoxia* (Hussain et al., 2018) for treating skin issues. Preliminary preclinical evidence also exists for the use of *Euphorbia hirta* (Thakur et al., 2014), *Glycyrrhiza glabra* (Tajuddin et al., 2005), and *C. longa* (Chenniappan & Murugan, 2017). *Indigofera aspalathoides*, when combined with honey, was reported to increase the success rate of skin treatments (Kavousi et al., 2019). Although *C. nucifera* oil has been reported to help alleviate dermatological issues (Kolahdooz et al., 2014), its external application lacks solid scientific backing.

5. Conclusion

Dermatological conditions are significant yet underrepresented health concerns in India, strongly influenced by cultural and social factors. The affordability and accessibility of healthcare services drive individuals toward traditional healing systems for treating skin conditions. Further comprehensive studies on the use of *C. nucifera, Curcuma longa*, and *Thespesia populnea* for dermatological treatments could provide valuable insights. The safety and efficacy of *S. china, E. acaulis*, and *Boswellia serrata* for addressing skin conditions should also be thoroughly evaluated. Robust research is recommended for species like *C. longa, T. populnea, C. nucifera*, and *A. indica* in the context of skin ailments. Further investigations into *Acorus calamus* and *C. dactylon* are warranted to explore their potential for treating these conditions. Additional studies on *B. serrata, Citrullus colocynthis, E. acaulis, Euphorbia hirta, Hydnocarpus pentandrus,* and *I. aspalathoides* may lead to the development of nutraceuticals for managing dermatological issues while preserving their traditional identities.

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The authors declare that they have no known competing financial interests or personal

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