

**IDENTIFICATION OF 'AREA OF RESEARCH' IN LEECH
APPLICATION (A SURVEY STUDY)****Vd. Sonal Lalit Patil^{1*}, Dr. Dipali Ravibhushan Sonawane²**

¹PG Scholar (Department of Panchakarma, Shree Saptasahrungi Ayurved Mahavidyalaya, and Hospital, Nashik).

²Professor (Department of Panchakarma, Shree Saptasahrungi Ayurved Mahavidyalaya, and Hospital, Nashik).

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Corresponding Author*Vd. Sonal Lalit Patil**

PG Scholar (Department of
Panchakarma, Shree Saptasahrungi
Ayurved Mahavidyalaya, and
Hospital, Nashik).



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ABSTRACT

Leech application is a highly valued local treatment practiced by many Ayurvedic practitioners as a supportive therapy. Owing to its broad clinical utility, this subject was chosen for systematic study. For the present study, observations were collected using a structured Google Form, the link to which was forwarded to 100 practitioners, clinicians, and academicians. The responses obtained were collected, tabulated, discussed, and conclusions were drawn accordingly. The survey reveals that a substantial number of practitioners use leeches without prior laboratory investigations and encounter complications that are managed using both modern and Ayurvedic medicines. The study also identifies several areas that remain largely unexplored in research, including leech cultivation, classification of different leech species, standardized methods of collection, breeding and maintenance of leeches, pathophysiological changes following leech

application, the composition of blood retained within the leech, and the potential for disease transmission through leech therapy. This survey was undertaken to generate further information and knowledge on these underexplored dimensions of Jalaukavacharan.

KEYWORDS: Leech application, Jalaukavacharan, Raktamokshan, Panchakarma, survey study.

INTRODUCTION

Panchakarma is a specialized branch of Ayurveda dealing with the purification of the body through five major procedures — Vaman, Virechana, Basti, Nasya, and Raktamokshana — which are routinely practiced in clinical settings. Among these, Raktamokshan holds particular significance, as it is directed at the purification of Rakta Dhatu. When Rakta Dhatu becomes vitiated by the Tridoshas, it gives rise to a wide range of disorders, including Twak Dushti, Kushtha, varicose veins, Gulma, Netra Roga, Vatarakta, Sandhigata Vata, Shiroroga, and Visarpa, among others.

Acharya Sushruta attached great importance to Rakta Dhatu, recognizing it as a causative factor in numerous Sarvadehik (systemic) and Sthanik (local) disorders. For Sarvadehik Raktadushti, Siravedha is the procedure of choice, whereas for Sthanik Raktadushti, Jalaukavacharan, or leech application, is the preferred mode of treatment.

Leech application is widely practiced across the Ayurvedic community by practitioners, clinicians, academicians, and Vaidyas, and is valued as a supportive treatment that frequently produces remarkable clinical results. However, despite its widespread use, there appears to be insufficient documented knowledge to address many of the practical and scientific questions surrounding leech therapy. This gap persists largely because of a discontinuity in the flow of knowledge, attributable to the limited availability of published research papers, journals, and research articles dedicated specifically to this therapy.

OBJECTIVES

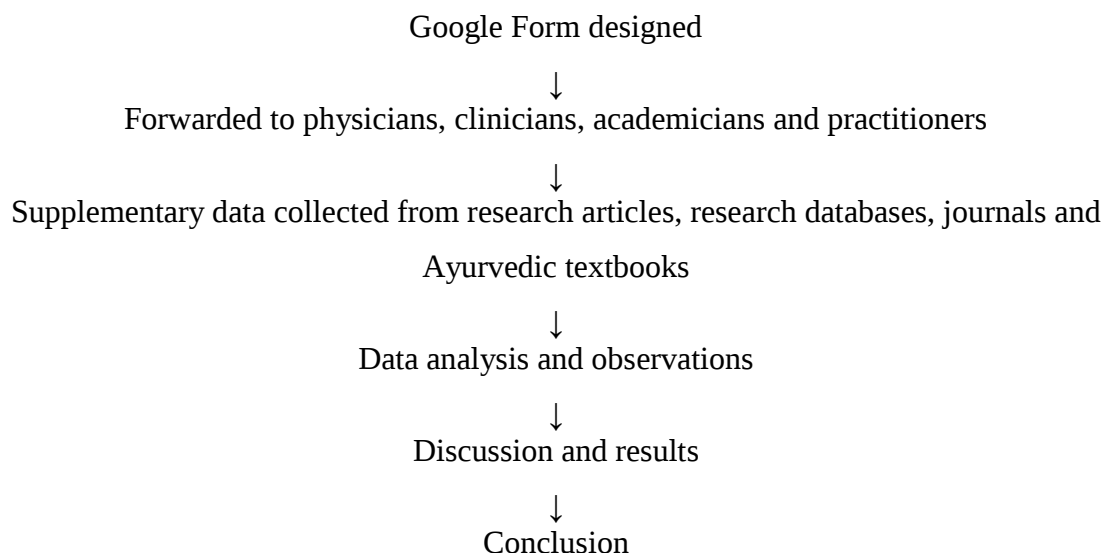
1. To generate data through a structured Google Form survey.
2. To study the literature on leech therapy as described in classical Ayurvedic texts.
3. To study the literature on leeches as described in zoological texts.

MATERIALS AND METHODS

Study Design: A cross-sectional survey study.

A structured questionnaire was designed using a Google Form and was electronically forwarded to physicians, clinicians, academicians, and practitioners actively engaged in Ayurvedic clinical practice. In addition to the primary survey data, supplementary information was gathered through a review of relevant research articles, research databases, peer-reviewed journals, and classical Ayurvedic textbooks. The collected data were then

analyzed, the observations tabulated, and the findings discussed to draw meaningful conclusions regarding the current state of knowledge and the areas requiring further research.

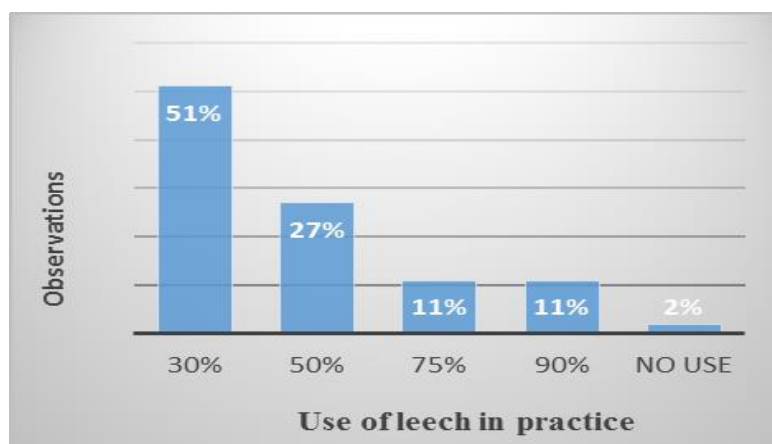


OBSERVATIONS

A total of 100 responses were received from practitioners, clinicians, and academicians. The responses pertaining to each survey item are tabulated and graphically represented below.

Table 1: Use of Leech in Practice.

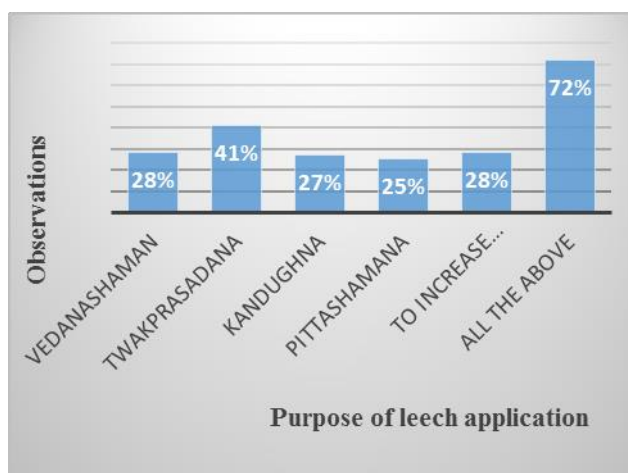
Use of leech in practice	Observations
30%	51%
50%	27%
75%	11%
90%	11%
No use	2%



Graph 1: Use of Leech in Practice.

Table 2: Purpose of Leech Application

Purpose of leech application	Observation
Vedanashaman	28%
Twakprasadana	41%
Kandughna	27%
Pittashamana	25%
To increase blood circulation	28%
All the above	72%

**Graph 2: Purpose of Leech Application.****Table 3: Diseases in Which Leech Is Used.**

Diseases	Observation
skin problems	57%
sandhigat vata	18%
vericose vein	43%
Wound healing & Plastic surgery	22%
All the above	49%

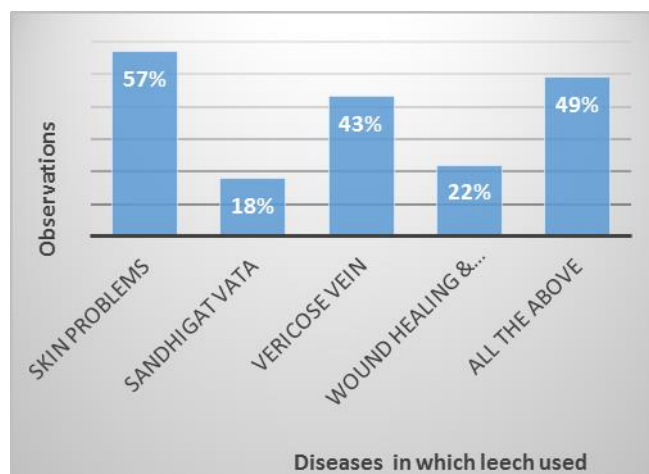
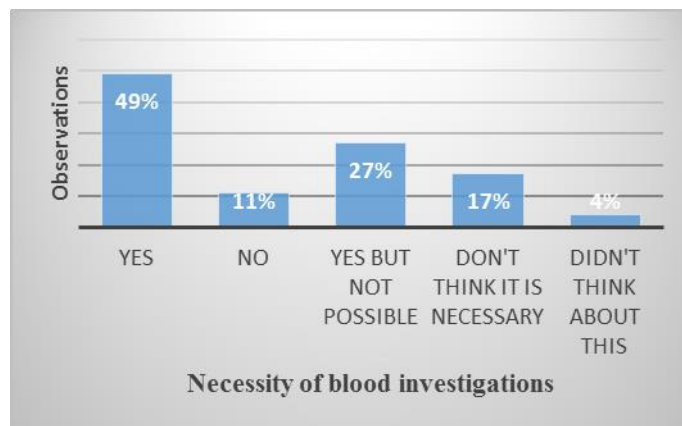
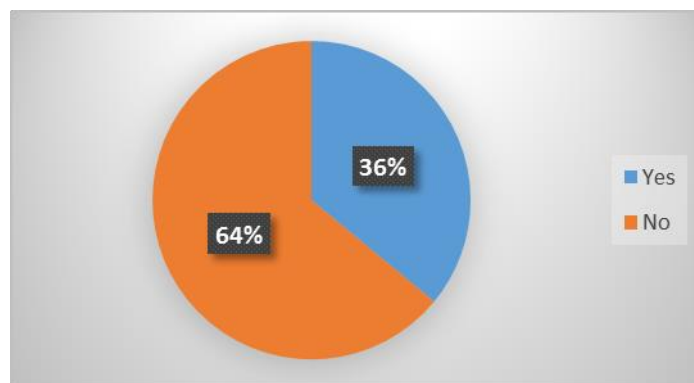
**Graph 3: Diseases in Which Leech Is Used.**

Table 4: Necessity of Blood Investigations.

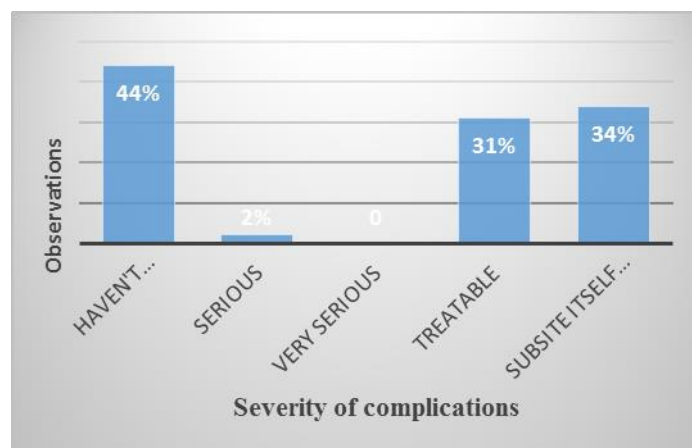
Necessity of blood investigations	Observation
Yes	49%
No	11%
Yes but not possible	27%
Don't think it is necessary	17%
Didn't think about this	4%

**Graph 4: Necessity of Blood Investigations.****Table 5: Experience of Complications.**

Experience complication	Observation
Yes	36%
No	64%

**Graph 5: Experience of Complications.****Table 6: Severity of Complications.**

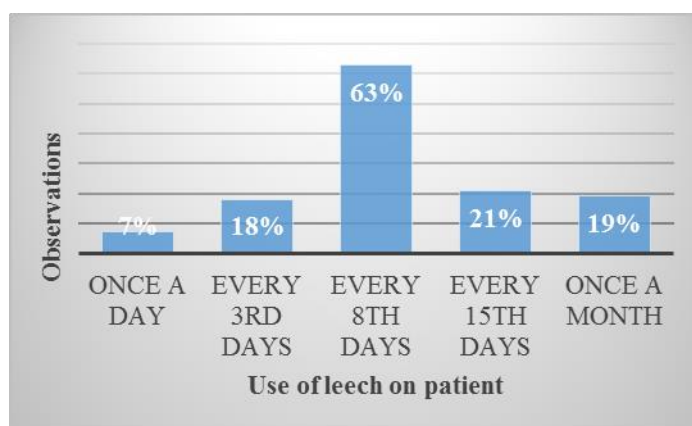
Severity of complications	Observation
Haven't experienced yet	44%
Serious	2%
Very serious	0
Treatable	31%
Subsite itself after some time	34%



Graph 6: Severity of Complications.

Table 7: Frequency of Leech Use on Patient.

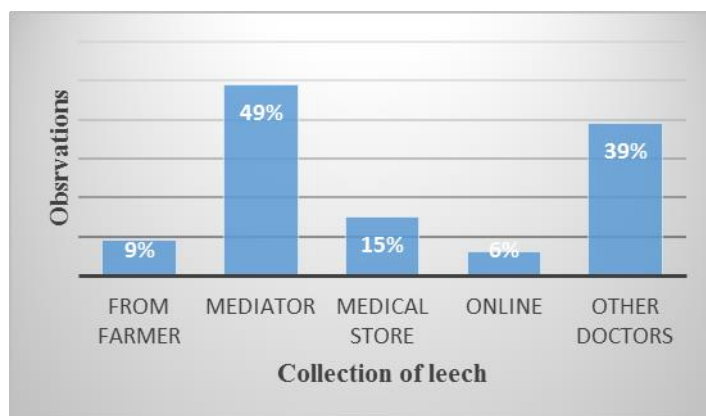
Use of leech on patient	Observation
Once a day	7%
Every 3rd days	18%
Every 8th days	63%
Every 15th days	21%
Once a month	19%



Graph 7: Frequency of Leech Use on Patient.

Table 8: Source of Leech Collection.

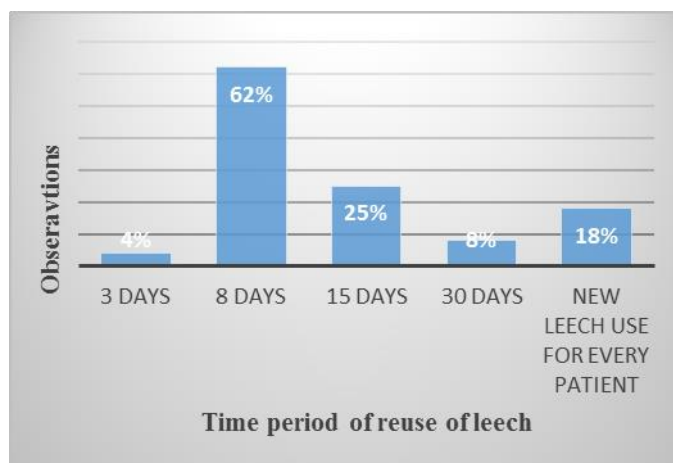
Collection of leech	Observation
From farmer	9%
Mediator	49%
Medical store	15%
online	6%
Other doctors	39%



Graph 8: Source of Leech Collection.

Table 9: Time Period of Leech Reuse.

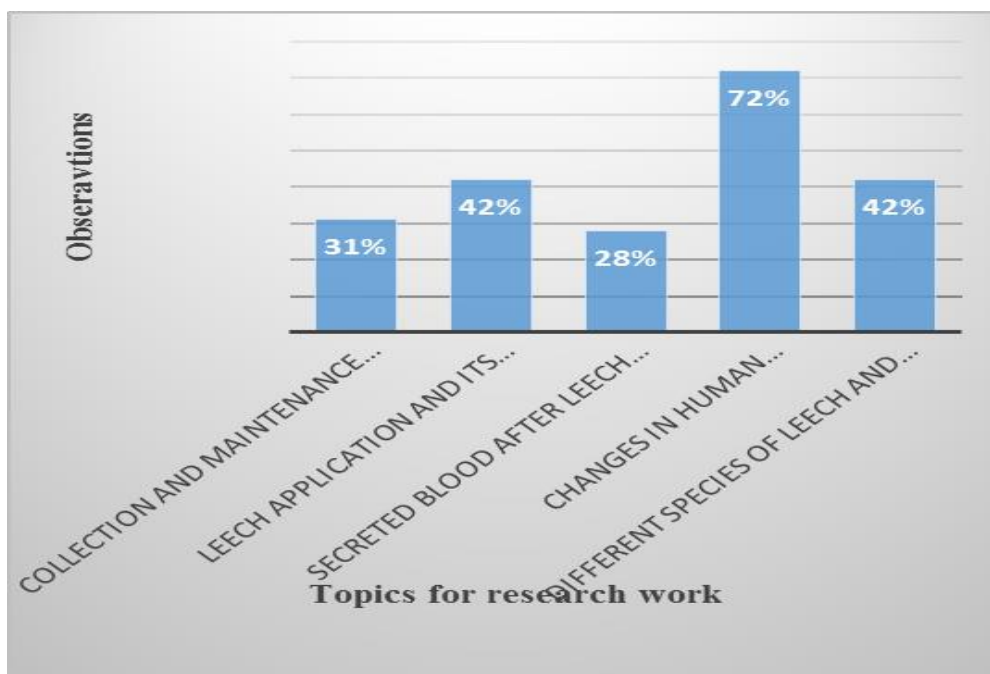
Reuse of leech	Observation
3 days	4%
8 days	62%
15 days	25%
30 days	8%
New leech use for every patient	18%



Graph 9: Time Period of Leech Reuse.

Table 10: Suggested Areas for Future Research.

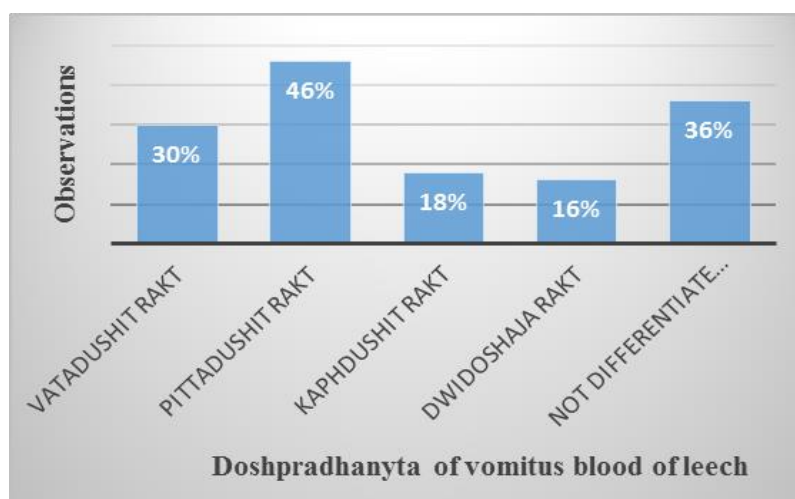
Work should done on	Observation
Collection and Maintenance of Leech	31%
Leech application and its secretions in blood	42%
Secreted blood after leech application	28%
Changes in human hematological parameters after leech application	72%
Different species of leech and its changes in blood after its application	42%



Graph 10: Suggested Areas for Future Research.

Table 11: Dosha Predominance of Vomitus Blood of Leech.

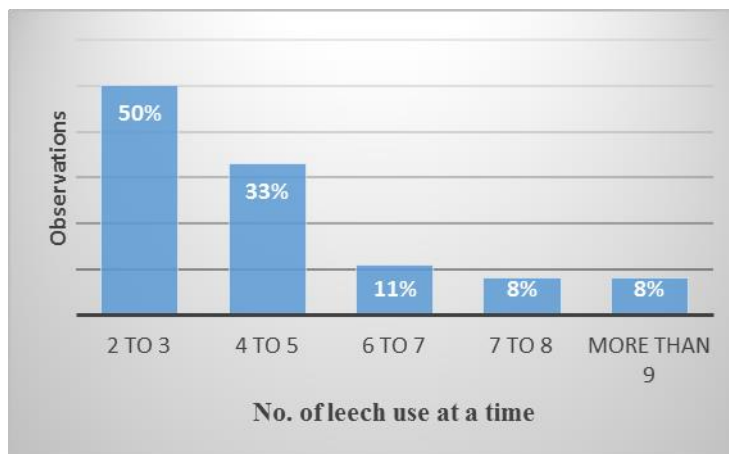
Doshpradhanyta of vomitus blood of leech	Observation
Vatadushit rakt	30%
Pittadushit rakt	46%
Kaphdushit rakt	18%
Dwidoshaja rakt	16%
Not differentiate clearly	36%



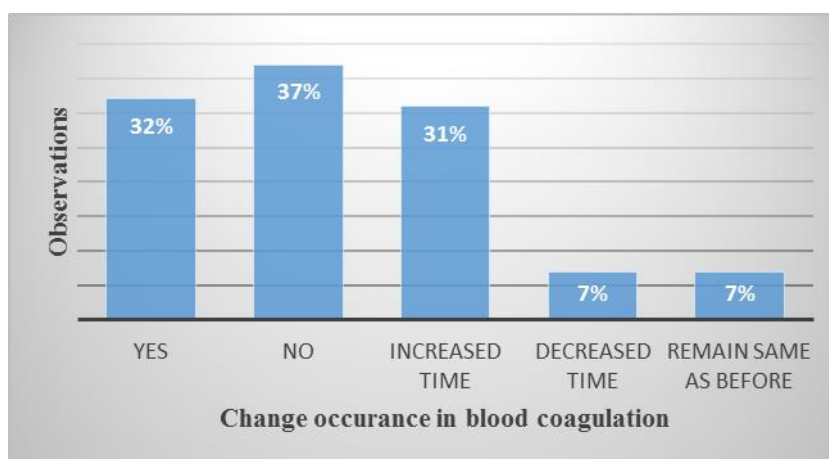
Graph 11: Dosha Predominance of Vomitus Blood of Leech.

Table 12: Number of Leeches Used at a Time.

No. of leech use at a time	Observation
2-3	50%
4-5	33%
6-7	11%
7-8	8%
More than 9	8%

**Graph 12: Number of Leeches Used at a Time.****Table 13: Change in Blood Coagulation After Leech Application.**

Change occurrence in blood coagulation	Observation
Yes	32%
No	37%
Increased time	31%
Decreased time	7%
Remain same as before	7%

**Graph 13: Change in Blood Coagulation After Leech Application.**

RESULTS AND DISCUSSION

The present survey was conducted among 100 Ayurvedic practitioners, clinicians, and academicians to identify the current pattern of clinical practice in leech application and to pinpoint the gaps in knowledge that warrant future research. The findings are discussed observation-wise below, followed by an integrated discussion of their collective clinical and academic significance.

1. Pattern of Clinical Use of Leech Therapy

Table 1 and Graph 1 show that the majority of respondents (51%) use leech therapy in approximately 30% of their overall clinical practice, while smaller proportions reported usage at 50% (27%), 75% (11%), and 90% (11%) of their practice. Only 2% of respondents reported no use of leech therapy at all. This distribution indicates that Jalaukavacharan is not a fringe or rarely used procedure but rather an established, regularly employed modality across the surveyed population, even though for most practitioners it remains a supportive or adjunct treatment rather than the primary mode of therapy. The near-universal familiarity with the procedure (98% reporting at least some use) underscores its acceptance within contemporary Ayurvedic practice and strengthens the rationale for generating a stronger evidence base around it.

2. Therapeutic Purpose of Leech Application

Table 2 and Graph 2 demonstrate that leech application is employed for a wide spectrum of therapeutic purposes. Twakprasadana (improvement of skin complexion and texture) was the most frequently cited individual indication (41%), followed by Vedanashaman (pain relief, 28%), promotion of blood circulation (28%), Kandughna (relief from itching, 27%), and Pittashamana (alleviation of Pitta-related symptoms, 25%). Notably, 72% of respondents selected “all the above,” indicating that in routine practice, leech therapy is rarely used for a single isolated indication; rather, practitioners value its multi-dimensional therapeutic action. This polyvalence is consistent with the classical description of Jalaukavacharan as a procedure that simultaneously addresses Raktadushti, Vedana, and Twak Vikara, and it suggests that any future mechanistic research should examine multiple physiological pathways rather than a single mode of action.

3. Disease Conditions Treated

Table 3 and Graph 3 indicate that skin problems are the most common condition for which leech therapy is used (57%), followed by varicose veins (43%), a composite “all the above”

category (49%), wound healing and plastic surgery applications (22%), and Sandhigata Vata (18%). The prominence of dermatological indications aligns with the high reported use of leech therapy for Twakprasadana in Table 2, reinforcing skin disease as the principal clinical domain of this therapy among the surveyed practitioners. The use of leeches in wound healing and reconstructive/plastic surgery, although reported by a smaller proportion of respondents, is noteworthy because it reflects convergence between traditional Ayurvedic practice and contemporary biomedical applications of hirudotherapy, particularly in microsurgery and flap salvage, where modern medicine has independently validated the use of medicinal leeches.

4. Necessity of Laboratory Investigations Prior to Leech Application

Table 4 and Graph 4 reveal a critical gap in current practice. While 49% of respondents felt that blood investigations are necessary before leech application, only a fraction are able to act on this; 27% indicated that investigations are necessary but not feasible in their practice setting, 17% did not consider it necessary, 11% answered “no,” and 4% had not previously considered the question. Cumulatively, this means just under half of practitioners are applying leeches without the benefit of baseline laboratory screening (for example, for bleeding disorders, anemia, or transmissible infections), most often due to practical constraints rather than a considered clinical judgment that such screening is unimportant. This finding directly substantiates the concern raised in the abstract regarding the use of leeches without lab investigations, and it represents an important patient-safety gap that structured clinical guidelines could help address.

5. Occurrence and Severity of Complications

Table 5 and Graph 5 show that 36% of practitioners have experienced complications associated with leech therapy, while the majority (64%) have not. Among those who specified the severity (Table 6, Graph 6), 44% reported having not experienced any complications, 34% described complications as self-limiting (subsiding spontaneously), 31% considered them treatable, and only 2% rated them as serious, with no respondent reporting a “very serious” complication. Taken together, these results suggest that while complications are not infrequent, they are overwhelmingly mild, self-resolving, or readily manageable, supporting the overall safety profile of leech therapy when practiced appropriately. Nevertheless, the existence of a non-trivial complication rate (36%) reinforces the need for

the laboratory screening and standardized handling protocols discussed in the previous section.

6. Frequency and Scheduling of Leech Application

Table 7 and Graph 7 show considerable variation in the scheduling of repeat leech applications on the same patient, with the largest group of practitioners (63%) applying leeches every 8th day, followed by every 15th day (21%), once a month (19%), every 3rd day (18%), and once a day (7%). This wide variability indicates the absence of a standardized, evidence-based interval for repeat application, with practitioners instead relying on individual clinical experience or regional training traditions. This lack of standardization is itself an important candidate for future research, as the optimal interval likely depends on the disease being treated, the rate of local tissue recovery, and the degree of systemic effect desired.

7. Sourcing and Reuse Practices

Table 8 and Graph 8 indicate that leeches are most commonly obtained through intermediaries or mediators (49%), followed by other doctors (39%), medical stores (15%), direct procurement from farmers (9%), and online sources (6%). The predominance of informal or semi-formal supply chains (mediators and peer referral together accounting for the majority of sourcing) suggests an absence of standardized, quality-controlled, or regulated sources for medicinal leeches, which has implications for both the consistency of therapeutic effect and the risk of disease transmission.

This concern is compounded by the reuse practices documented in Table 9 and Graph 9, where 62% of practitioners reported reusing the same leech after a gap of approximately 8 days, while 25% reuse after 15 days, 8% after 30 days, and only 18% use a new leech for every patient (with 4% reusing after just 3 days). The widespread reuse of leeches across patients, particularly within a short interval such as 8 days, raises a legitimate concern regarding cross-patient disease transmission, especially given that formal protocols for leech sterilization, quarantine, or single-use disposal do not appear to be uniformly practiced. This observation directly supports the concern noted in the abstract regarding diseases potentially spread through leech application and identifies leech maintenance and hygiene protocols as a priority area for future investigation.

8. Number of Leeches Applied per Session

Table 12 and Graph 12 show that most practitioners (50%) use 2 to 3 leeches per session, with 33% using 4 to 5, 11% using 6 to 7, and small minorities (8% each) using 7 to 8 or more than 9 leeches at a time. This suggests a generally conservative, low-dose approach to leech application in routine practice, although the rationale for selecting the number of leeches per session (whether based on lesion size, disease severity, or simple convention) is not captured by the current survey and would benefit from further documentation.

9. Dosha Predominance of Vomitus Blood

Table 11 and Graph 11 present practitioners' assessment of the Doshapradhanyata (dosha predominance) of the blood expelled by the leech during therapy. Pittadushit Rakta was the most frequently identified pattern (46%), followed by Vatadushit Rakta (30%), a substantial proportion who could not differentiate clearly (36%), Kaphadushit Rakta (18%), and Dwidoshaja Rakta (16%). The relatively high proportion of practitioners unable to clearly differentiate the dosha predominance of the expelled blood (more than one in three respondents) highlights a significant gap between classical theoretical description and practical clinical assessment skills, and points to the need for clearer diagnostic criteria, training, or even objective correlation with biochemical or hematological markers to make this assessment more reproducible across practitioners.

10. Effect on Blood Coagulation

Table 13 and Graph 13 show divided opinion regarding the effect of leech application on blood coagulation: 37% of respondents reported no change, 32% reported some change, 31% specifically noted an increase in coagulation time, and small proportions reported a decrease (7%) or no change at all relative to baseline (7%). This divided response is notable because medicinal leech saliva is well documented in the broader scientific literature to contain anticoagulant and antiplatelet compounds (such as hirudin), which would be expected to prolong coagulation time, at least locally and transiently. The fact that more than a third of practitioners observed no change suggests either limited systemic absorption at the doses and frequencies typically used in Ayurvedic practice, inconsistent or informal monitoring of coagulation parameters, or both. This represents an important and very specific candidate for controlled, laboratory-based research, since perceptions reported in a survey cannot substitute for actual pre- and post-application coagulation studies.

11. Identified Priority Areas for Future Research

Table 10 and Graph 10 directly addressed practitioners' own perception of where future research effort should be concentrated. The area receiving the strongest endorsement was changes in human hematological parameters after leech application (72%), followed by leech application and its secretions in blood (42%) and differences among leech species and the corresponding changes in blood after application (42%). Collection and maintenance of leech received 31% endorsement, and changes in the secreted blood itself after application received 28%. These priorities are well aligned with the gaps already identified through the rest of the survey: the uncertainty around coagulation effects (Table 13), the inability to clearly characterize Doshapradhanyata of expelled blood (Table 11), and the informal, unregulated sourcing and reuse practices (Tables 8 and 9) all converge on the same broad need: rigorous, laboratory-supported characterization of the biological and hematological effects of leech therapy, alongside standardized protocols for leech sourcing, species identification, and maintenance.

INTEGRATED DISCUSSION

Viewed together, the thirteen observations of this survey paint a consistent picture. Leech application enjoys broad acceptance and is used confidently for a wide range of indications, predominantly dermatological and vascular conditions, and is generally perceived as safe, with complications that are infrequent and, when they occur, largely self-limiting or manageable. At the same time, the survey exposes a set of interlinked gaps that recur across multiple observations: an absence of routine pre-procedure laboratory screening (Table 4), non-standardized leech sourcing through informal intermediaries (Table 8), reuse of leeches across patients without clearly defined hygiene or sterilization protocols (Table 9), wide variability in treatment scheduling without an evidence base (Table 7), inconsistent clinical assessment of the dosha character of expelled blood (Table 11), and divided, largely subjective impressions of the procedure's effect on coagulation (Table 13).

These gaps are not isolated; they form a coherent research agenda. Leech cultivation and species identification (raised in Table 10) would directly support more standardized and traceable sourcing (Table 8), which in turn would make hygiene and reuse protocols (Table 9) easier to define and enforce. Likewise, systematic laboratory characterization of hematological changes after leech application, the single most strongly endorsed research priority in this survey (Table 10), would resolve the present ambiguity around coagulation

effects (Table 13) and could eventually provide objective correlates for the traditional Doshapradhanyata assessment of vomitus blood (Table 11), bridging classical Ayurvedic description with modern diagnostic parameters. In this sense, the survey does not merely catalogue isolated deficiencies but reveals a logically connected set of priorities, beginning with leech biology and sourcing, extending through clinical protocol standardization, and culminating in hematological and pathophysiological characterization, that together define a practical roadmap for future research in Jalaukavacharan.

From a methodological standpoint, it is also worth noting that this survey captures practitioners' perceptions and reported practices rather than objectively measured clinical or laboratory outcomes. The divided responses on coagulation change (Table 13) and the substantial proportion of practitioners unable to characterize Doshapradhanyata clearly (Table 11) are best interpreted as markers of where controlled clinical and laboratory studies are most urgently needed, rather than as definitive findings in themselves. The strength of this survey lies precisely in its ability to identify these priority areas from the collective experience of 100 practitioners, clinicians, and academicians, providing a practice-grounded foundation upon which future controlled studies can be designed.

CONCLUSION

- Leech therapy (Jalaukavacharan) is widely practiced and is perceived as a safe, versatile, and effective supportive treatment for a broad range of medical and surgical conditions, particularly dermatological and vascular disorders, with complications that are infrequent and generally mild or self-limiting.
- The survey identifies clear and actionable gaps in current practice, namely inconsistent pre-procedure laboratory screening, informal and non-standardized leech sourcing, reuse of leeches without defined hygiene protocols, and wide variability in treatment scheduling, all of which represent opportunities for the development of standardized clinical guidelines.
- Several scientifically important but under-researched areas have been identified, including leech cultivation and species-wise classification, the composition and dosha characterization of vomitus blood, the precise pathophysiological and hematological changes induced by leech application, and the potential for disease transmission through leech reuse.

- The bioactive elements present in leech saliva possess immense therapeutic potential; however, there remains a clear need to study these constituents at the molecular level to elucidate their specific mechanisms and therapeutic actions.
- Large-scale, well-designed clinical and laboratory studies are needed to re-establish this ancient therapeutic method on robust scientific grounds, thereby strengthening its integration into evidence-based clinical practice.