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Mulberry Silk (*Bombyx mori*) in the Kashmir Valley: A Socio-historical Study of Sericulture and Traditional Healing Knowledge

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Abstract

Background: Kashmir has one of the oldest sericulture traditions in South Asia. Beyond their role in trade and craft, mulberry and silk are deeply woven into local systems of knowledge and healing, particularly within the *Unani*-Tibbi medical tradition. This body of traditional knowledge is a form of intangible cultural heritage that has received little scholarly documentation and is now at risk of disappearing. **Aim:** This study examines the historical development and continuing social significance of mulberry- and silk-related healing knowledge in the Kashmir Valley, using the frameworks of traditional ecological knowledge and intangible cultural heritage. **Methods:** Between March 2023 and September 2024, 128 semi-structured interviews were conducted with *Unani* healers (*Hakims*), mulberry farmers, traditional midwives, and silk workers across all ten districts of the Kashmir Valley. Interviews were combined with a review of classical *Unani* manuscripts and historical sources. Standard ethnobotanical indices (Use Value, Informant Consensus Factor, Fidelity Level) were used as indicators of how widely and consistently each practice was known within these communities, not as measures of medical proof. **Results:** Thirty-four traditional practices involving mulberry and silk were documented, spanning wound care, respiratory and digestive complaints, women's health, and matters of sleep and memory. These practices form a coherent, long-standing body of knowledge with strong internal agreement among practitioners, and in places show interesting points of resonance with recent biomedical literature, although establishing clinical effectiveness was outside the scope of this study. **Conclusion:** Mulberry and silk occupy a central place in Kashmir's traditional knowledge systems. This knowledge is now held mainly by an ageing generation of practitioners and is not being passed on. Documenting it, and engaging with it respectfully and equitably, is as much a matter of cultural heritage as it is of medicine.

Major Findings: Silk-thread wound care and mulberry fruit syrup for cough emerged as the most widely and consistently held practices. This knowledge survives mainly among older *Hakims* and farmers and is at real risk of not being passed on to younger generations.

Keywords: *Bombyx mori*, Ethnobotany, Intangible Cultural Heritage, *Morus alba*, Mulberry, Kashmir, Silk, Traditional Knowledge, *Unani* Medicine

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1. Introduction

The Kashmir Valley sits between the Pir Panjal and the Great Himalayan ranges, at about 1,600 m above sea level. Its climate and soil have supported a wide range of plants and a long tradition of local medicine. Among these resources, mulberry and silk hold a special place: Silk farming, tied to the cultivation of the mulberry tree (*Morus alba*, and later *Morus multicaulis*) and the rearing of the silkworm *Bombyx mori*, dates back more than two millennia in this Himalayan valley[1,2]. Beyond commerce and craft, almost every part of this system - the mulberry leaf, bark, root, and fruit, the silkworm, the cocoon, the raw silk thread, and by-products such as sericin-has long been used as a home remedy in Kashmiri households.

Earlier studies have looked more broadly at the medicinal plants used across Kashmir[3], including

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work specifically on *Unani* practice in the region[4] and on healers in Baramulla district[5]. The present study builds on this earlier work by focusing specifically on the knowledge surrounding mulberry and silk, and by situating it more explicitly within social-science approaches to traditional knowledge.

1.1 Theoretical Framework

This study is framed by two related bodies of theory. The first is Traditional Ecological Knowledge (TEK): The cumulative, practice-based understanding that communities build up about their local environment and resources through sustained interaction with them over generations[6]. The second is the concept of Intangible Cultural Heritage (ICH), as defined by UNESCO: The practices, knowledge, and skills that communities recognise as part of their own heritage, and that are transmitted from one generation to the next[7]. Read together, these frameworks suggest that Kashmiri healing knowledge around mulberry and silk is best understood primarily as a living cultural and epistemic system, shaped by history, environment, and social relationships, rather than simply as a set of unverified medical claims awaiting confirmation by laboratory science.

This study also draws, more cautiously, on the idea of medical pluralism: the coexistence, within the same society, of several differently legitimised systems of healing, in this case *Unani* medicine, biomedicine, and household or folk practice. Where relevant, the discussion notes points of resonance between Kashmiri traditional knowledge and recent biomedical or phytochemical literature. This is not intended as scientific validation, but as an illustration of how different knowledge systems sometimes converge, and of how each can be a source of insight for the other. For example, sericin, the protein that coats raw silk, and a mulberry-leaf compound known as DNJ, have both attracted attention in recent laboratory research relevant to wound care and blood sugar regulation, respectively[8-11]; such findings are noted here as points of scholarly interest, not as proof that the Kashmiri remedies discussed in this paper are clinically effective.

The study is also motivated by an urgent practical concern: the declining number of practising *Hakims* (*Unani* physicians), the displacement of mulberry cultivation by other crops, and the weakening of the informal channels through which this knowledge has traditionally passed from one generation to the next. If it is not documented now, as a matter of cultural record, much of it risks being lost.

The study aims to trace the history of mulberry cultivation and silk farming in Kashmir, from early historical records to the present day, and to document, through ethnographic fieldwork, the traditional healing knowledge associated with mulberry and silk among Kashmiri communities. It further seeks to describe how widely and consistently this knowledge is held by using standard ethnobotanical indices as indicators of cultural consensus. The study also aims to situate this body of knowledge within the theoretical frameworks of traditional ecological knowledge and intangible cultural heritage. In addition, it cautiously examines points of resonance between this traditional knowledge and recent biomedical literature, without treating such comparisons as a means of validating traditional knowledge. Finally, the study considers how this knowledge might be appropriately documented, respected, preserved, and shared fairly with the communities who hold and transmit it.

2. Historical Background: Silk and Mulberry in Kashmir

2.1 Early History

The history of silk in Kashmir goes back to the Valley's earliest written records. The oldest known references appear in the Nilmat Purana (6th-7th century CE), an early *Sanskrit* text that describes finely woven cloth and trees bearing "threads made by worms." Chinese records from the Tang Dynasty (618-907 CE) also mention Kashmir trading fine woven goods along Silk Road routes. Kashmiri weaving traditions likely began with wild *tussar* silk, before organised silk farming using *Bombyx mori* and *Morus alba* became established, probably around the 14th century, as Kashmir's ties with the wider Persian-speaking world grew.

2.2 The Mughal Period

Silk farming reached its peak as a state-supported industry under Mughal rule (16th-18th century). Emperor Akbar (reigned 1556-1605) expanded mulberry planting across the Valley and had silk production methods formally recorded. The

Ain-i-Akbari[12], written by Abu'l-Fazl, describes the silk fabrics made in Srinagar and how fine *pashmina* wool was combined with silk thread in Kashmiri shawls. Emperor Jahangir (reigned 1605-1627), who visited Kashmir many times, wrote about the Valley's natural beauty and its silk gardens in his memoir, the *Tuzuk-i-Jahangiri*[13]. He ordered large mulberry plantations around Dal Lake and the Jhelum River plain. By the late Mughal period, Kashmir was one of the empire's leading silk-producing regions, with dedicated state-run silk farms known as *Resham Karkhanas*.

2.3 *Unani* Medicine and Mulberry

Alongside the silk trade, a parallel medical tradition developed. *Unani-Tibbi* medicine, based on Greek and Arab medical ideas and later shaped by Persian, Indian, and Central Asian knowledge, became the main formal system of medicine in Kashmir under the Sultanate and Mughal periods. Founding *Unani* texts, including Ibn Sina's *Qanun fi al-Tibb* (Canon of Medicine)[1], and later Persian-language texts such as the *Makhzan-ul-Adwiya*[14] and the *Minhaj-ul-Illaj*[15], describe medicinal uses of *Tut* (mulberry) in detail. Kashmiri *Hakims* adapted this classical knowledge to the mulberry trees growing around them. The leaves, bark, root, fruit, and even the silk cocoon were each assigned specific properties, based on the *Unani* understanding of a substance's quality, strength, and action. Historical manuscripts and archives held in Srinagar record many traditional formulas that use mulberry, evidence of a long-standing, textually grounded system of local knowledge rather than an informal or ad hoc set of household remedies.

2.4 From Colonial Rule to the Present Day

Under *Sikh* and *Dogra* rule (1819-1947), and later as part of the Jammu and Kashmir state, silk farming became a government-run industry[16]. A silk factory was set up in Srinagar in 1897 under the *Dogra* rulers, and silk farming was later expanded under the state's Sericulture Department. This turned silk farming into more of an industrial activity, and in the process weakened the close social relationship between silk farmers, mulberry growers, and traditional healers, on which the transmission of this knowledge had long depended. Today, the Sericulture Department of Jammu and Kashmir supports mulberry farming across about 28,000 hectares of land, working with around 35,000 registered farming families[17]. Despite this large industry, the traditional healing knowledge linked to mulberry and silk has received little institutional attention or documentation, and survives mainly in the memory of older practitioners.

3. Methods

3.1 Study Area

Fieldwork was carried out across the Kashmir Valley, covering all ten districts: Srinagar, Budgam, Pulwama, Shopian, Anantnag, Kulgam, Bandipora, Baramulla, Kupwara, and Ganderbal. Extra attention was given to rural upland areas of Baramulla, Pulwama, and Anantnag, which have traditionally grown the most mulberry.

3.2 Ethnographic Fieldwork

Interviews were carried out between March 2023 and September 2024, with separate visits in spring (April-May, during the mulberry leaf harvest) and autumn (September-October, during cocoon collection and mulberry fruit season), so that seasonal knowledge was not missed. In total, 128 people were interviewed: The study included 47 registered *Unani Hakims* working in government and private practice, 38 senior mulberry farmers aged over 60 years with inherited plant knowledge, 24 traditional midwives (*dais*) and women healers, and 19 elderly silk workers and rearers with inherited traditional knowledge. Interviews were conducted in Kashmiri and Urdu. Participant consent was obtained before documenting information for the study, and participants were informed that the material could be used in academic publications. No commercially sensitive family recipes were included without the knowledge-holder's agreement. Participants were recruited through snowball sampling, with each participant identifying other relevant knowledge-holders. Recruitment continued until no substantially new practices were being reported; this point was reached after 112 interviews, followed by 16 additional interviews to cross-check less commonly reported practices. The interview material was organised thematically for analysis.

3.3 Cultural Consensus Indicators

To describe how widely and consistently each traditional practice was held across the communities interviewed, three measures commonly used in ethnobotanical research were calculated for each of the 34 documented practices. These are treated here as descriptive, sociological indicators of shared knowledge, not as measures of medical proof. Use Value (UV) refers to how often a particular practice was mentioned relative to the total number of people interviewed, with a higher score indicating that the practice is more widely known within the community. Informant Consensus Factor (ICF) indicates the degree of agreement among informants regarding which practice is used for a given purpose, with a score close to 1 representing strong shared agreement. Fidelity Level (FL) represents the percentage of people who mentioned a particular plant part specifically for its main reported purpose rather than for other purposes, with a higher percentage indicating a more specific and consistent association between the plant part and its reported use. Selected principal practices are summarised in Table 1; the study documented 34 practices in total. Use Value (UV), Informant Consensus Factor (ICF), and Fidelity Level (FL) were used as descriptive ethnobotanical indicators of the distribution and consistency of reported knowledge. In this manuscript, these values are interpreted only as indicators of cultural reporting patterns and informant agreement; they are not treated as evidence of therapeutic or clinical efficacy.

3.4 Historical and Textual Sources

Classical texts in Arabic, Persian, Urdu, and Sanskrit were reviewed using manuscript archives in Srinagar and digital collections from the National Mission for Manuscripts, New Delhi, to trace the historical depth of this knowledge system. This was complemented by a narrower, secondary review of recent biomedical and phytochemical literature (via PubMed, Web of Science, Scopus, and Google Scholar, up to March 2025), undertaken solely to identify points of possible resonance between traditional and biomedical accounts, discussed in Section 5. This literature review was narrative rather than systematic, and no attempt was made to grade or rank the traditional practices by biomedical evidence strength, since that was not the purpose of the study.

3.5 A Note on Supplementary Measurements

As this is primarily a historical and ethnographic study, only two small supplementary measurements were carried out, purely to illustrate rather than establish scientific plausibility for two widely reported practices. Vitamin C content of fresh mulberry fruit from three traditional growing sites in Baramulla was measured by HPLC at the Department of Food Science and Technology, SKUAST-K (three samples per site, reported as mean ± standard deviation). DNJ levels in dried mulberry leaves were measured by HPLC-MS/MS at CSIR-IIIM Jammu (five samples from traditional growing sites). The measured vitamin C and DNJ values are presented descriptively in Section 4 to provide supplementary context for the traditionally reported uses of mulberry. Where relevant, no inferential statistical testing was carried out on them, since this study does not attempt to demonstrate clinical efficacy; this is discussed further as a limitation in Section 5.5.

4. Traditional Knowledge and Practice: Ethnographic Findings

The sections given describe the main categories of traditional practice identified through fieldwork, read alongside relevant historical texts. Occasional references to recent biomedical literature are included, in keeping with the framework set out in Section 1.1, as points of scholarly resonance rather than as evidence of clinical effectiveness; most such studies concern mulberry or silk in general, not the specific Kashmiri preparations described here. Index scores for selected principal practices are presented in Table 1 (Section 4.6).

4.1 Wound Care and Skin Practices

4.1.1 Silk Thread and Sericin for Wounds

The most widely and consistently reported practice was the use of raw, unwashed silk thread, locally called *Reshm-e-kham*, to treat wounds (Use Value 0.92; Consensus 0.94; Fidelity 89%). Healers in all ten districts described washing raw cocoon silk in warm water with walnut bark (*Juglans regia*), then placing it directly over cuts. One *Hakim* from Pulwama district, with 45 years of experience, explained that the sericin coating on the silk is understood, within *Unani* reasoning, to keep the wound moist and to help resist

infection. Recent laboratory studies describe similar protective properties for sericin[8]. The correspondence is best read as a shared point of interest between two different knowledge traditions rather than as proof that the traditional practice is clinically effective.

4.1.2 Mulberry Bark Paste for Skin Problems

The inner bark of *Morus alba*, ground and mixed with mustard oil (*roghan sarson*), was widely reported as a preparation applied to the skin for eczema (*khaj*), psoriasis-like rashes, and fungal skin infections (Use Value 0.80; Consensus 0.89; Fidelity 76%). Seventeen informants also described using bark washes to bathe infants with cradle cap and skin rashes, a practice still current in rural Anantnag district. Some laboratory studies report antimicrobial activity for compounds found in mulberry bark[18].

4.1.3 Silk Cocoon Ash for Burns

A more unusual practice, described by four senior *Hakims*, involves burning empty mulberry silk cocoons, after the silk has been unwound, to make a fine ash known as *khakistar-e-pilay* (Use Value 0.41; Consensus 0.72; Fidelity 61%). This ash, mixed with honey, was applied to minor burns and said to have a cooling, soothing effect and to reduce blistering. Separately, laboratory research on silk-based materials for burn care has explored their use in supporting skin healing[9], though again this should not be read as confirmation of the traditional practice.

4.2 Respiratory Practices

4.2.1 Mulberry Fruit Syrup for Sore Throat and Cough

Mulberry fruit syrup (*sharbat-e-tut*) was the best-known preparation overall, mentioned by 97 of the 128 people interviewed (Use Value 0.76; Consensus 0.91; Fidelity 83%). Ripe mulberries, both white and dark varieties, are pressed, and the juice is mixed with sugar, honey, and crushed cardamom to make a thick syrup used for sore throat and dry cough. In classical *Unani* thought, mulberry is considered "cold and moist," making it suitable for conditions linked to heat and dryness, such as a sore, inflamed throat, a classification system with its own internal logic distinct from biomedical reasoning. In this study, vitamin C levels in Kashmiri mulberry fruit were measured, as a secondary and purely illustrative note, at 28-36 mg per 100 g fresh weight (mean 31.4 ± 2.6 mg/100 g; 9 samples).

4.2.2 Mulberry Leaf Tea for Asthma

Senior *Hakims* in Baramulla and Kupwara described boiling mulberry leaves (*tut ke patte ka joshanda*) to make a decoction used for asthma, both drunk and inhaled as steam (Use Value 0.61; Consensus 0.84; Fidelity 69%). Compounds identified in mulberry leaf have separately attracted some biomedical interest in relation to breathing conditions[19], though this traditional use should not be regarded as a substitute for standard asthma treatment.

4.3 Digestive and Metabolic Practices

4.3.1 Mulberry Leaf Tea and Blood Sugar

Seventy-three informants, mostly older *Hakims* and farmers, described drinking dried, powdered mulberry leaf as a tea for excessive thirst, frequent urination, and general weakness, a symptom cluster that in Kashmiri understanding is associated with an imbalance of bodily strength (Use Value 0.57; Consensus 0.87; Fidelity 71%). A compound in mulberry leaf known as DNJ has attracted particular biomedical interest for its effect on blood sugar[10]. In this study, DNJ levels of 0.18-0.28% (dry weight) were measured, again as a secondary note, in Kashmiri mulberry leaves, broadly similar to levels reported elsewhere in Asia[10]. This traditional practice should not be treated as a substitute for medical care for diabetes.

4.3.2 Mulberry Root Bark for Digestion and Worms

The root bark of *Morus alba*, boiled to make a strong decoction, was reported by 61 informants as a traditional treatment for intestinal worms (*kirmak*) and constipation (Use Value 0.48; Consensus 0.79; Fidelity 63%). Classical *Unani* texts specifically mention mulberry root bark (*Pust-e-Bikh-e-Tut*) as a remedy for tapeworm, an instance of long textual continuity between historical manuscripts and present-day oral practice[20].

4.4 Practices Relating to Sleep and Memory

4.4.1 Silk Cocoon Broth for Sleep Problems

A locally reported practice was described by senior practitioners in the Gurez and Lolab valleys: a broth

made by boiling empty silk cocoons with saffron and warm milk, given to people with insomnia and anxiety (*waswas*) (Use Value 0.23; Consensus 0.61; Fidelity 52%). No published account of this specific preparation was identified in the literature searched up to March 2025. It is therefore presented here as a locally reported practice of interest in its own right, rather than as a practice validated by existing biomedical research.

4.4.2 Mulberry Fruit for Memory

Eleven elderly *Hakims* mentioned using black mulberry fruit in tonic mixtures for memory problems and "mental tiredness" in old age (Use Value 0.34; Consensus 0.68; Fidelity 57%), framed by practitioners as a matter of restoring bodily and mental strength in later life, a framing that sits within a broader *Unani* understanding of ageing rather than a narrowly biomedical one[11].

4.5 Practices Relating to Women's Health

Traditional midwives (*dais*) in rural Pulwama and Shopian described applying fresh mulberry leaf poultices to reduce swelling and help healing after childbirth (Use Value 0.30; Consensus 0.71; Fidelity 59%). A mixture of mulberry bark boiled in sesame oil was applied to the lower abdomen for period pain (Use Value 0.32; Consensus 0.74; Fidelity 62%). Six practitioners described giving mulberry fruit juice mixed with fenugreek seeds to new mothers to help with breastfeeding (Use Value 0.25; Consensus 0.63; Fidelity 54%)[18]. These practices sit within a wider

Table 1. Selected principal traditional practices involving mulberry and silk-derived materials documented in the Kashmir Valley (n = 128 informants), with cultural consensus indicators

Practice/local name	Plant Part/source	Preparation and use	Reported purpose	N	UV	ICF	FL%
Reshm-e-kham wound dressing	Silk cocoon (sericin-coated thread)	Undegummed thread washed in walnut-bark infusion, applied directly	Wound healing, cuts	118	0.92	0.94	89
Mulberry bark paste	*Morus alba* inner bark	Ground bark + mustard oil (*roghan sarson*), applied to skin	Eczema, psoriasis-like rash, fungal skin infection	103	0.80	0.89	76
Cocoon ash (*khakistar-e-pilay*)	Spent silk cocoon	Burnt to ash, mixed with honey, applied to skin	Burns, scalds	52	0.41	0.72	61
Mulberry fruit syrup (*sharbat-e-tut*)	*Morus alba*/M. multicaulis fruit	Juice + sugar + honey + cardamom, taken by mouth	Sore throat, dry cough	97	0.76	0.91	83
Mulberry leaf decoction	*Morus alba* leaf	Boiled leaf; steam inhaled and liquid drunk	Asthma, breathlessness	78	0.61	0.84	69
Mulberry leaf tea (*joshanda*)	*Morus alba* leaf (dried/powdered)	Steeped in water, drunk daily	Excessive thirst, weakness (diabetes-associated symptoms)	73	0.57	0.87	71
Mulberry root bark decoction (*Pust-e-Bikh-e-Tut*)	*Morus alba* root bark	Strong decoction, taken by mouth	Intestinal worms, constipation	61	0.48	0.79	63
Silk cocoon broth with saffron	Empty silk cocoons	Boiled with saffron and warm milk, taken at bedtime	Insomnia, anxiety (*waswas*)	29	0.23	0.61	52
Black mulberry tonic (*muqawwiyat-e-dimagh*)	*Morus nigra* fruit	Fruit added to compound *Unani* tonic	Memory weakness, cognitive fatigue	44	0.34	0.68	57
Fresh mulberry leaf poultice	*Morus alba* leaf	Crushed fresh leaves applied to perineum	Postpartum swelling, wound healing	38	0.30	0.71	59
Mulberry bark + sesame oil	*Morus alba* bark	Bark boiled in sesame oil, applied to abdomen	Period pain	41	0.32	0.74	62
Mulberry fruit + fenugreek seed	*Morus alba* fruit + *Trigonella foenum-graecum*	Fruit juice mixed with powdered fenugreek	Aid to breastfeeding	32	0.25	0.63	54

N = number of informants reporting the practice; UV = Use Value; ICF = Informant Consensus Factor; FL = Fidelity Level (%). These are descriptive indicators of how widely and consistently a practice is held within the communities surveyed, not measures of medical proof.

tradition of women's health knowledge held and transmitted primarily by *dais*, largely outside formal *Unani* training, and are especially exposed to the generational transmission gap discussed in Section 5.3.

4.6 Summary Table

Table 1 shows the consensus indicators for selected principal practices documented in the study.

5. Discussion

5.1 Traditional Knowledge as a Coherent Cultural System

Read as a whole, the practices documented in this study do not appear as a loose collection of folk beliefs, but as a coherent, internally consistent body of knowledge, historically grounded in classical *Unani* texts and sustained by high levels of agreement among present-day practitioners (Consensus scores of 0.79-0.94 for the main practices). This consistency is itself a significant finding: It suggests a system of knowledge transmitted with some rigour across generations and across the different districts of the valley, rather than a set of isolated or idiosyncratic household habits.

At several points, this traditional knowledge shows interesting resonance with recent biomedical and phytochemical literature, for instance around the use of silk in wound care and mulberry leaf in relation to blood sugar. It is worth being reflective about this: The present study was designed, in its literature review, to look for such points of resonance, and was not designed to test, in a symmetrical way, practices for which no such biomedical literature yet exists. This is a common interpretive bias in ethnobiological research of this kind. The absence of biomedical literature on a given practice, such as the cocoon broth for sleep or the mulberry-fenugreek preparation for breastfeeding, should not be read as evidence that the practice lacks value or meaning within Kashmiri healing culture; it may simply mean that these practices are, as yet, less studied by biomedical science, rather than less legitimate as knowledge.

5.2 Knowledge Systems, Authority, and Whose Knowledge Counts

This raises a broader question about epistemic authority: Whose knowledge is treated as legitimate, and on what terms. Traditional healing knowledge of this kind is often treated, implicitly, as a source of hypotheses awaiting confirmation by biomedical science, rather than as a body of knowledge with its own internal logic and standards of validity. This study has tried to treat Kashmiri *Hakims*, farmers, midwives, and silk workers as holders of a valid, historically grounded system of knowledge in its own right, and has used the language of medical pluralism to describe how this system coexists, sometimes uneasily, alongside biomedicine within the same communities. This does not mean that traditional claims should be accepted uncritically, nor that biomedical caution is unwarranted, particularly regarding dosage, safety, and interactions with modern medicines; rather, it means that the two systems are better understood as different, coexisting ways of organising knowledge about the body and healing, each shaped by its own history and social context, than as a single hierarchy with biomedicine at the top.

5.3 Knowledge at Risk

Of the 47 *Unani Hakims* interviewed, only 11 were under 55 years old. Formal *Unani* medical training in Jammu and Kashmir today focuses on standard textbook knowledge rather than local, region-specific plant knowledge of the kind documented here. Among the 38 senior farmers with plant knowledge, almost all said their children had moved to cities or taken up other kinds of work. The traditional midwives all said that younger women in their communities now prefer to give birth in hospitals, meaning fewer people are learning traditional women's health knowledge. The pattern is unambiguous: This knowledge is concentrated among the oldest living generation and is not, in general, being transmitted to younger cohorts. Without active documentation, much of this knowledge could disappear within one or two generations, a loss that would be cultural and historical as much as medical.

5.4 Documenting and Sharing this Knowledge Fairly

Based on these findings, three steps are suggested. First, this knowledge should be recorded now, through a properly resourced programme involving regional agricultural research institutions, the Sericulture Department, and the Central Silk Board, creating a shared archive of interviews, plant specimens, and

recorded practices, treated explicitly as a heritage-documentation project rather than only a scientific data-gathering exercise. Second, where communities and practitioners are willing, selected practices of particular interest, such as silk cocoon preparations for sleep or mulberry bark for skin conditions, could be explored further through interdisciplinary collaboration between ethnographers and biomedical researchers, always led by questions the communities themselves consider important. Third, any further study or possible future use of this knowledge, including its consideration for inclusion in India's national *AYUSH* framework for traditional medicine, must proceed only with the full, informed consent of, and fair benefit-sharing with, the communities who hold it, in line with India's obligations under the Nagoya Protocol on Access and Benefit-Sharing. This means obtaining consent before recording knowledge, and agreeing in advance how any benefits, financial or otherwise, will be shared. Treating this knowledge as freely available raw material, rather than as the property of the communities who have sustained it, would be both an ethical failure and a practical risk to future research relationships in the region.

5.5 Limitations

This study has several limitations worth noting. First, because people were asked to recall past practices, there is a risk that some details were remembered inaccurately, especially for practices used only in certain seasons; interviewing across different seasons reduced but did not remove this risk. Second, this was a cross-sectional interview study, which can describe what people believe and do, but cannot establish whether any practice affects health outcomes; that was never the aim of this study. Third, the consensus indicators (Use Value, Consensus, Fidelity) describe how widely known and consistent a practice is; they say nothing about medical efficacy. Fourth, the two supplementary chemical measurements (vitamin C and DNJ) were included only as an illustrative aside and cover a small fraction of the practices described; they should not be read as a systematic phytochemical survey. Fifth, because participants knew this was an academic study, some may have over-emphasised certain practices. Finally, the sampling method, while appropriate for fieldwork of this kind, does not produce a sample that statistically represents every traditional knowledge-holder in the Kashmir Valley, and the findings should be read as an in-depth account of a particular set of communities rather than as a population-level survey.

6. Conclusion

Mulberry and silk are more than valuable materials in Kashmir; they are part of a long relationship between local communities and the natural world, one that has produced both fine textiles and a rich, historically grounded body of healing knowledge built up over more than two thousand years. This study has documented 34 traditional practices involving mulberry and silk, spanning wound care, skin problems, coughs, digestion, memory, and women's health, and has described how widely known and consistent each practice is within the communities that hold it. Understood through the lenses of traditional ecological knowledge and intangible cultural heritage, this body of practice deserves to be treated as a subject of study in its own right, not simply as a set of hypotheses for biomedical science to confirm or dismiss. At the same time, this knowledge is now held mainly by older community members and is at real risk of being lost within a generation. Its documentation, and any further engagement with it by researchers or policymakers, should proceed with the same care, humility, and respect for community consent that any study of a living cultural tradition demands. Kashmir's silk tradition carries meaning not only on the loom, but in the dispensary of everyday household knowledge, and both deserve serious, careful attention.

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Author Contribution

Tasdeeq Ul Islam and Mohd Ashraf Dar contributed to the conception and design of the study, field investigation, historical and textual research, analysis and interpretation of the material, and revision of the manuscript. Tasdeeq Ul Islam prepared the manuscript for submission and served as the corresponding author. Both authors read and approved the final manuscript.