ISSN: 2249- 5746
International Journal of Ayurvedic and Herbal Medicine 15:4 (2025) 5043-5052
Journal homepage: http://www.interscience.org.uk
DOI: 10.47191/ijahm/v15i4.03
Impact Factor: 8.254

Shilajit For Female Health: An Evidence-Based Review

Ashif Iqubal[1], Sayed Abdur Rehman[2], Ferooz Ahmad[3], BDS Bedi[4], Tanuja Singh[5], Abdul Qadir *[6,7]

[1]Research and Development Advisor, Herbified Healthcare, New Delhi-110020, India

[2]Research and Development Executive, Herbified Healthcare, New Delhi - 110020, India

[3]Director, Kashmir Food & Wellness Products, Village Gundbal, near Cricket Ground, Pampore, Jammu and Kashmir 191103, India

[4]Chief coach, Medico Marketing Consultant, Adjoining K Area, Off Shimla Highway, Dhakoli, Zirakpur-140603, Punjab, India

[5]Centre for Interdisciplinary Research for Basic Science (CIRBSc), Ramanjun Block, Jamia Millia Islamia, New Delhi - 110025

[6]CEO, Herbified Healthcare, New Delhi - 110020, India

[7] Director, Herbified Research Foundation, New Delhi - 110020, India

***Corresponding Author: Dr. Abdul Qadir**

CEO, Herbified Healthcare

New Delhi, India, 1100220

Director, Herbified Research Foundation

New Delhi, India, 1100220

ABSTRACT: Shilajit is an ancient herbomineral compound with rich traditional uses. However, recently, extensive scientific research has been conducted to validate its health benefits, confirming its efficacy and safety. Shilajit contains fulvic acid, along with various other compounds, such as polyphenols, trace elements, minerals, and more. The combination of these natural components makes this herbo-mineral compound a powerful antioxidant and anti-inflammatory agent. It is also important to note that the current use of Shilajit is mostly limited to men for overall well-being, immune boosting, and enhancing endurance, strength, and stamina. Additionally, different formulations of Shilajit are available to promote calming effects, aid with insomnia, sexual dysfunction, and more. Notably, women still face barriers in using Shilajit due to its explicit claims related to men's sexual health. As a result, many women do not benefit from this remarkable natural compound. In this manuscript, we discuss the scientific evidence supporting the use of Shilajit for women. We have compiled data from both preclinical and clinical studies to explore its potential benefits for females.

KEYWORDS: Shilajit; Hormone balance; Stamina; Skin health; Insomnia and anxiety

INTRODUCTION

Shilajit is a tar-like resinous material that oozes out of rocks in high mountainous areas (especially the Himalayas, Altai, and others) [1]. For centuries, it has been treasured in Ayurvedic and traditional medicine as a rejuvenating substance known as a rasayana, the conqueror of mountains and destroyer of weakness [2]. The chemical structure of Shilajit consists of a complex phyto-mineral substance, which is composed of both fulvic acid and humic acid, as well as more than 80 minerals, including important metals such as iron, Zinc,

Magnesium, calcium, and copper [3,4]. Recent attention to Shilajit by modern scientists has been because of its claimed antioxidant, anti-inflammatory, and adaptogenic effects [5]. Although a lot of conventional claims continue to exist, scientists have now begun to analytically study the health effects of Shilajit in both preclinical conditions (laboratory and animal settings) and clinical trials [6,7]. This review comprehensively explores the health benefits of Shilajit for women, highlighting its nutrient composition and therapeutic potential based on available scientific evidence, such as skin health, Reproductive health, Anti-cancer activity, Neuroprotection, and bone metabolism, as shown in **Figure 1**. Every section focuses on the present-day conclusions (as of mid-2025), based on scientific facts (peer-reviewed studies), making the discussion valuable to both healthcare professionals and individuals concerned about their health.

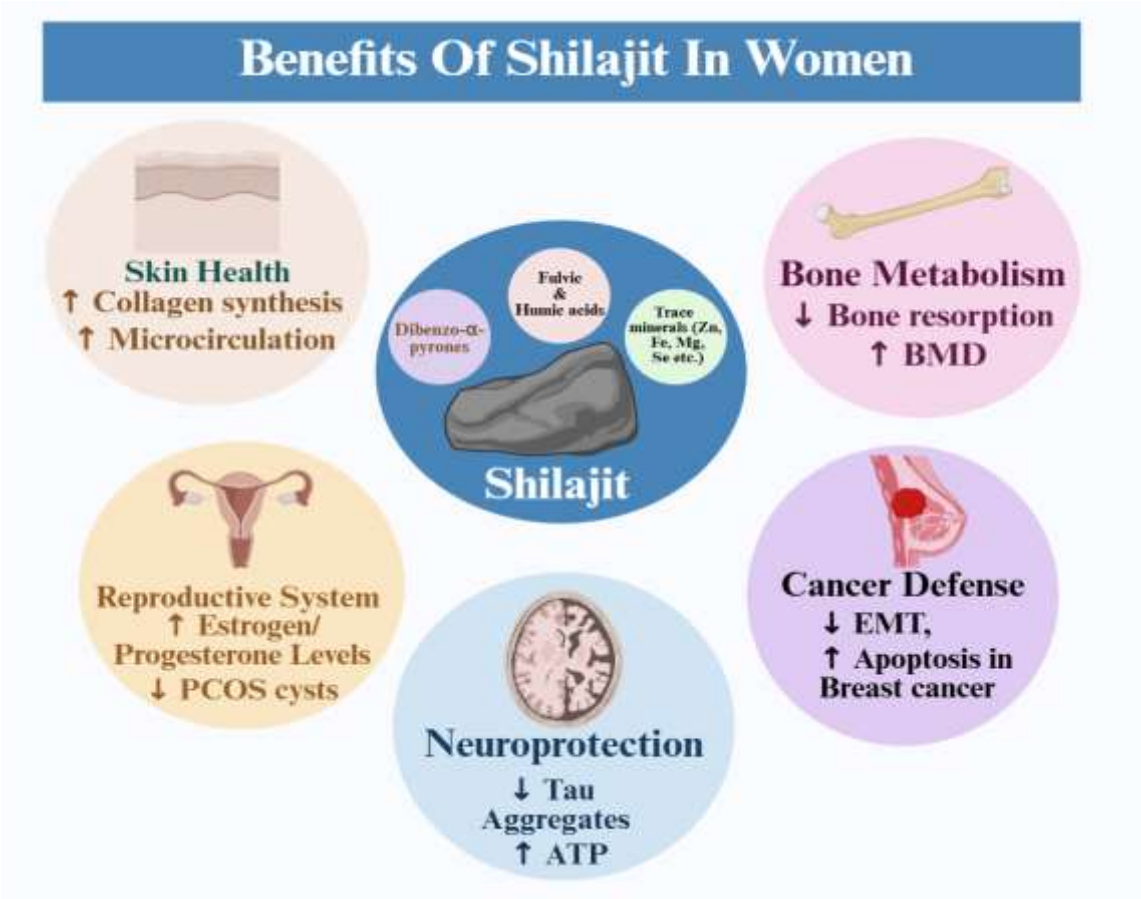

Figure 1. Showing Benefits of Shilajit in women with scientific evidence.

Skin Health and Anti-Aging Dermatology

Healthy skin is a pinnacle of health and an outward sign of age. Shilajit has demonstrated dermatological potential, especially in its fulvic acid content and antioxidant capacity and presence of minerals like zinc (Protects from photodamage) [8], copper (Serves as an antioxidant) [9] and Selenium (Protect skin from UV irradiation-induced oxidative stress) [10]. In a randomized clinical trial, middle-aged females (45 and 55 years) received an oral dose of Shilajit (125 and 250 mg; twice daily for 14 weeks) and were examined with skin biopsies for gene expression analysis. Gene expression outcomes revealed upregulation of collagen synthesis, extracellular matrix (ECM) maintenance, and microvascular development-related genes. Pathway analysis also indicated endothelial cell migration, as well as blood vessel enlargement, in the skin. Accordingly, high-dose Shilajit significantly augmented micro perfusion (blood flow) of the skin when compared with the rest and placebo [11]. The results suggest that Shilajit may aid in skin regeneration and nutrient supply due to its ability to stimulate dermal circulation and collagen synthesis.

These clinical findings are supplemented by the laboratory findings [12]. Fulvic acid contained in Shilajit is a very strong antioxidant and can fight oxidative stress, one of the main sources of skin aging (wrinkles, elasticity). Shilajit may help prevent cellular damage caused by UV radiation and environmental stress to skin cells, thanks to its ability to neutralize free radicals and alleviate inflammation. Remarkably, a recent 8-week randomized study by Neltner et al. demonstrated that the daily administration of Shilajit (500 or 1000 mg) led to over 60 and 100 percent increases in markers of type I collagen synthesis compared to healthy volunteers, but not in the placebo group [12]. The major structural protein in skin is Collagen, which stimulates the production of skin to help the skin to stay firm and have fewer fine lines [13]. These studies combined give a mechanistic explanation to the traditional image of Shilajit as a skin rejuvenator. Those who take Shilajit expect to see a difference in the hydration rates and elasticity levels of the skin, as well as texture, due to the increased microcirculation and the boosted support of collagen.

Based on positive findings related to dermal biopsies and increased collagen production and extracellular maintenance with improved microvascular perfusion of the skin following oral Shilajit treatments [11,12]We hypothesize these effects can be similarly observed in hair-forming units in the scalp. Fulvic and humic acids, along with microelements such as Zn, Se, Mg, may enhance the synthesis of ATP by the dermal papilla cell through the PI3K-AKT signaling pathway, stimulate the ERK/Akt signaling and improve cell survival (an increase in the Bcl-2/Bax ratio), and stimulate nitric-oxide-mediated dilatation of perifollicular capillaries. The overall effect would be enhanced nutrient supply to the hair bulb, better oxygen supply to the hair bulb, increased activity of keratin-generating enzymes due to Zn and Se, and growing stronger anagen-phase hair (**Figure 2**) [14]. This multi-modal mechanism, by replication of Shilajit, known collagen and circulation benefits to the skin, which offers a logical biological explanation as to why this deep-rooted step can be used in preventing or reversing hair loss.

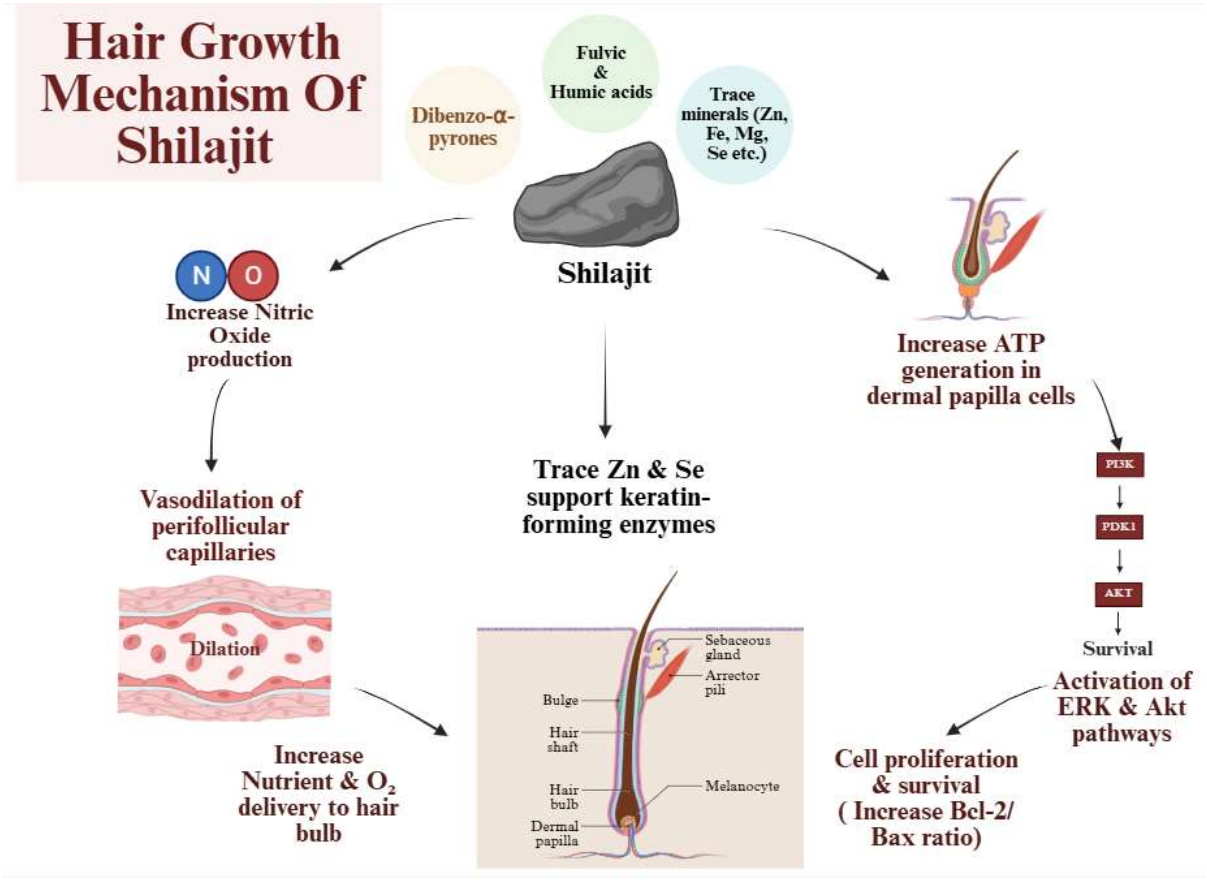

Figure 2. Proposed Mechanism of Action of Shilajit in Hair Loss.

Reproductive Health and Fertility

Ayurveda has traditionally used shilajit as a natural aphrodisiac and fertility booster, and it appears that it does have the potential to improve reproductive health in that way [15]. In men, evidence is very strong: a randomized controlled trial in infertile males (Biswas et al., 2010) revealed that 90 days of purified Shilajit (100 mg twice daily) produced significant changes in sperm parameters where total sperm count was increased by greater than 60%, sperm motility was improved by approximately 15%, and normal sperm forms improved approximately 19% compared with baseline. An increase in serum testosterone levels was also found to increase by ~23% (with FSH increasing by ~9%), implying a rise in the overall male reproductive hormones [7]. These results confirm the use of Shilajit in male infertility and, by implication, lend credence to Shilajit meddling with the endocrine pathways in the reproductive system.

In female reproductive health, the studies are finally catching up. One of the most interesting clinical studies (Mohammed et al., 2025) investigated hormone-deficient patients (both male and female) and showed that Shilajit supplement reduced female sex hormones to significant levels [16]. The post-treatment levels of serum estrogen and progesterone increased in the women who received Shilajit, then that of their pre-treatment levels. In the cases where the levels of these hormones were reported to have been low (such as in cases associated with infertility), Administration of Shilajit was reported to have normalised these levels, who concluded that Shilajit can treat infertility in both sexes [16]. This endocrine balancing effect may be the reason behind the anecdotal indications of Shilajit to increase female libido, vaginal dryness, and sexual health in its entirety [16]. Shilajit could help improve menstrual regularity and affect such conditions as luteal phase insufficiency or amenorrhea (but research is required) [16]. Another clinical trial with reproductive-aged women, Mosavi et al. found that oral Shilajit supplementation (200 mg twice daily for 60 days) significantly improved overall sexual function (measured by FSFI) compared to placebo (Mean FSFI at 90 days: 28.93 vs. 22.09; $P < 0.001$), with benefits observed across most domains. However, Shilajit did not significantly improve sexual quality of life compared to placebo ($P = 0.094$) [17].

Animal research also adds to the fertility-enhancing claims of Shilajit. Herbal formulation of Shilajit (Shilajatu Rasayana) showed drastic improvement of the ovarian functioning in a rat model of polycystic ovarian syndrome (PCOS), which is a major cause of female subfertility. Rats afflicted with PCOS induced by Letrozole that were treated with Shilajit exhibited reduced ovarian cyst scores, greater healthy follicle development, and normalization of ovarian weights, as shown in rats that received conventional ovulation drug treatment [18]. Hormone testing showed that Shilajit has contributed to restoring hormone balance and resensitization within the reproductive organs and insulin in this PCOS model [19]. These preclinical data are consistent with the traditional uses of Shilajit in female disorders, and it may have the potential to serve as a potential adjuvant management strategy to address reproductive disorders in females with hormonal imbalances like PCOS or infertile women with no identifiable causes [19]. Both clinical and preclinical data show the favorable effect of Shilajit on reproductive health.

Menopause and Bone Health

Women lose their estrogen after menopause, which causes them to develop osteoporosis [20]. A recent clinical trial by Pingali et al. (2022) is the most direct evidence of the benefit of Shilajit in postmenopausal women. This 48-week, randomized, double-blind, placebo-controlled study of 60 postmenopausal women with osteopenia showed that when taken daily, Shilajit extract (250 or 500 mg) dose-dependently maintained bone mineral density (BMD) [21]. The BMD at the lumbar spine and femoral neck level decreased steadily over time in the placebo subjects, but there were significant improvements in percent BMD vs. base ($p<0.001$) in the Shilajit-treated women [21]. Meanwhile, bone turnover markers (CTX-1, BALP, RANKL) declined, and osteoprotegerin increased in Shilajit groups, which means that bone resorption decreased [21]. There was a

reduction in oxidative stress (malondialdehyde) alongside an elevation in antioxidant glutathione, as well as a reduction in systemic inflammation (hsCRP) [21]. Combinedly, these changes indicate that Shilajit mitigated the hastened bone loss of estrogen deficiency. Studies suggested that Shilajit helps with BMD in postmenopausal cases through the reduction of the augmented bone turnover, inflammation, and oxidative stress [21]. Sadeghi et al. (2020) conducted a mixed-sex randomized trial to prove that shilajit works to accelerate the repair of bones. Patients (18 to 60 years, including female participants) with a history of tibial fracture were administered shilajit or placebo 500 mg/day for 28 days after the operation. The shilajit group achieved radiographic bone union significantly faster than controls, reducing healing time by approximately 24 days [22]. Although females were a small subgroup (6.5 percent of participants), these findings indicate possible advantages of fracture healing in both genders, especially females with a risk of developing fractures due to osteoporosis [22].

Aside from bone density, no controlled studies have tested Shilajit for classic menopausal symptoms (hot flashes, mood swings, etc.) in women. General claims that fulvic acid in Shilajit might ease hot flashes remain untested. Overall, current evidence indicates that Shilajit can mitigate postmenopausal bone loss, but its effects on other menopausal symptoms are unknown.

Energy, Metabolism, and Physical Performance

Shilajit appears to influence energy metabolism in animal models. In a study by Saqib et al. (2016), Shilajit was administered to a group of hyperlipidemic albino rats, and the effects were studied [23]. The group treated with Shilajit showed dose-dependent weight loss over an 8-week period compared to the control group. Studies have reported that shilajit used at higher dose levels is effective in reducing body weight [23]. These findings concluded that Shilajit could increase fat metabolism or energy expenditure in rodent creatures [23]. The results of other animal studies (not female-restricted) report that Shilajit raises the availability of ATP and the activity in the mitochondria, as well as reduces blood glucose levels in diabetic rat models (e.g. alloxan-based), without specifically investigating the female counterpart [24].

Clinical trials of Shilajit on metabolism or physical performance have been primarily done in men. As an example, in an 8-week trial in young men discovered that 500 mg/day Shilajit decreased the fatigue-induced loss in strength [25]. A female-specific trial on energy, weight loss, or athletic activity has not been done, however in a single mixed-sex trial by martinez et al., 2025 Shilajit with chromium and amla was tested in obese patients and reported modest alterations in metabolic parameters such as blood flow improvement, lipid profile, insulin sensitivity, body composition and strength over the period of 12 weeks [26].

Cognitive and Neurological Effects

The neuroprotective potential of Shilajit, due to its anti-inflammatory and antioxidant properties, has attracted interest, but no trial has evaluated cognitive outcomes in females. The preclinical evidence demonstrated the potential of Shilajit constituents: according to Andrade et al. (2023), an Andean Shilajit fraction stimulated neurite extensions in cultured neurons and significantly reduced aggregates of the tau protein after 10 days [27]. These data indicate that Shilajit compounds can inhibit significant mechanisms of Alzheimer's disease [27]. According to another in vitro study, fulvic acid, a key component of Shilajit, has been shown to increase cellular energy (ATP) and decrease amyloid toxicity [28]. Carrasco-Gallardo et al. (2012) conducted a placebo-controlled pilot study for a six-month regimen of 300 mg Shilajit plus B-complex vitamins in 16 patients, including women, administered twice daily to cognitively healthy volunteers (60.5 % female), produced the most reported effects of enhanced energy and improved memory performance. This study underscores Shilajit’s procognitive potential in women as well as men [29]. Therefore, the study of mechanistic types only implies that there is a possible cognitive health benefit to women.

Anti-Cancer

Shilajit extracts have been found to suppress breast cancer cell growth in vitro: e.g. Barouji et al., 2012 observed that mummy, i.e. Iranian shilajit, caused a dose-dependent toxicity on MCF-7 and MDA-MB-231 cell lines (IC50 on the order of several hundred micrograms per milliliter) with no cytotoxic effect on normal mammary cells (MCF-10A) [30]. Notably, gene expression profiling also showed that Shilajit results in downregulation of major epithelial-mesenchymal transition (EMT) and promotes metastatic factors (e.g. TGF-b1, TGF-bR1, TWIST1, Notch1, T-catenin) and upregulation of cell junction marker E-cadherin, an indication of pro-apoptotic and anti-metastatic effect [30]. Other reports also indicate the incidence of apoptosis and inhibition of NF-κB-mediated inflammatory signaling in Shilajit breast cancer cells, aligning with its proclaimed anti-inflammatory effect. Such anticancer properties can reasonably be attributed to its antioxidative compounds: Shilajit extracts have moderate free radical scavenging (e.g. 50% DPPH inhibition at milligram-level doses), and in vivo, they lower oxidative stress levels [31].

Shilajit-Based Nanocarriers (Drug Delivery

Nanotechnology can be utilized to enhance the bioactivity and pharmacokinetics of Shilajit by improving solubility, targeting, and cellular uptake. Recently, by Asadi et al. Shilajit nanocarrier loaded with doxorubicin (SHN-Dox, ~244 nm) was fabricated by the nanoprecipitation procedure. SHN-Dox showed sustained release and a much higher cytotoxicity to MCF-7 and ZR-75 -1 cells than the free drug [32]. A study showed that after 24 hours, SHN-Dox caused significantly higher apoptosis and intracellular ROS levels in MCF-7 cells, indicating SHN-Dox as a potential solution to mitigate the toxicity of Dox to normal cells. A study concluded that Shilajit nanocarriers can lead to an increase in efficacy in tumor cells and a decrease in toxicity in the rest of the body [32]. Other than drug conjugates, green-synthesis methods have also used Shilajit as a reducing/capping agent against metal-oxide NPs. As an example, aqueous Shilajit mediated the synthesis of ZnO nanoparticles with a significant cytotoxic effect on HeLa cells (IC5038.6) without affecting normal cells [33]. Perumal et al. Showed that the result of a ZnO-induced ROS buildup and apoptotic effect and proved that the phytochemicals contained in Shilajit can create and enhance the therapeutic potential of nanomaterials [33]. Research studies indicate that nanotechnology can refine the pharmacokinetic/pharmacodynamic profile of Shilajit, enhancing bioavailability and allowing for controlled release, and synergize the bioactivity of Shilajit with known drug chemotherapies [33]. In the future, additional formulations (e.g., liposomes or polymeric nanoparticles including fulvic/humic acids) should be investigated to enhance the administration of active ingredients in Shilajit or in combination therapy for breast cancer.

Table 1: Human Trials of shilajit in women.

Study Reference	Population	Dosage & Duration	Key Outcomes
[11]	Middle-aged women (45–55 years)	125 mg or 250 mg twice daily for 14 weeks	• Increases collagen synthesis, ECM maintenance, and microvascular gene expression. • Increases Skin micro perfusion (blood flow) in high-dose group vs. placebo. • Improved skin regeneration and nutrient supply.

[17]	Reproductive-aged women	200 mg twice daily for 60 days	• Significantly increases overall sexual function (FSFI score: 28.93 vs. 22.09, $p<0.001$). • No significant improvement in sexual quality of life ($p=0.094$).
[21]	Postmenopausal women with osteopenia (60 women)	250 mg or 500 mg daily for 48 weeks	• Dose-dependent increases bone mineral density (BMD) at lumbar spine/femoral neck ($p<0.001$). • Decreases Bone turnover markers (CTX-1, BALP, RANKL) which increases osteo protegrin. • Decreases oxidative stress (malondialdehyde) and inflammation (hsCRP); increases antioxidant glutathione.
[22]	Mixed-sex adults with tibial fracture (females),	500 mg/day for 28 days	• Accelerated radiographic bone union (reduced healing time by ~24 days). • Potential benefit for fracture healing in females at risk of osteoporosis-related fractures.
[26]	Mixed-sex obese patients (females),	Shilajit + chromium + amla for 12 weeks	• Modest improvements in metabolic parameters: blood flow, lipid profile, insulin sensitivity, body composition, and strength.
[29]	Cognitively healthy volunteers (female),	300 mg Shilajit + B-complex vitamins twice daily for 6 months,	• Enhanced energy and improved memory performance.

DISCUSSION

The existing evidence, primarily based on the preclinical stage, presents the potential of Shilajit and also highlights the gaps that need to be addressed. There is an urgent need to conduct clinical trials to test the efficacy of Shilajit in appropriate patient groups, preferably women. One important next step would be phase I/II trials of standardized Shilajit extracts (or its bioactive fractions) in females, perhaps as an adjuvant to chemotherapy or endocrine therapy in breast cancer. Trials are needed to develop safety, determine the optimum dosing, and establish pharmacokinetics, particularly in female cohorts. Alternatively, controlled trials have the potential to test Shilajit for treating menopausal symptoms and cognitive outcomes, as mechanistic evidence suggests its potential benefits. The future appears promising for research exploring the therapeutic potential of Shilajit. Nano is still green: there is still room to develop more nanocarriers based on Shilajit (e.g., Shilajit-lipid or polymeric NPs, targeted nanoparticle) to enhance the targeted delivery of Shilajit

to tumors and minimize off-target effects, as was the case with SHN-Dox system [33]. Diseases like rheumatoid arthritis is two to three times more prevalent in women than men, highlighting the importance of viable cartilage regenerating solutions. The latest study by Kazmi et al. has demonstrated that Shilajit-incorporated PVA/CMC nanofibrous mats exhibit significantly enhanced cell adhesion, proliferation, and antibacterial activity, along with suitable mechanical strength and controlled biodegradability. Such findings demonstrate the applications of Shilajit-based nano-formulations in cartilage repair and infection resistance, showing specific promise for women who have a disproportionate rate of joint degeneration [34]. Recently, a randomized controlled trial by Bahri et al. evaluated Shilajit as an adjunct treatment in hospitalized COVID-19 patients and reported its potential to reduce symptom severity, hospitalization duration, and ICU admissions [35]. Given that women are more vulnerable to immune-related complications and post-viral fatigue, these findings further highlight Shilajit's broader immunomodulatory and supportive role in women's health.

At the molecular level, studies must attempt to understand which moieties (e.g., α-Di-benzopyrones, fulvic acids, etc.) and cellular signalling pathways (NF-kB, TGF-beta, PI3K/Akt, and others) Shilajit produces its effects, and with a dose-response characterization, may determine a molecular basis of the response. Regulatory aspects are tricky: Shilajit is currently sold as dietary supplement, yet oncology indications would require the level of drug assessment. Therefore, it will be essential to carry out quality control (e.g. standardize content of fulvic acids, test the presence of heavy metals contaminants). New studies should a be conducted based on genders, if Shilajit modulates endocrine activity, this may mean different things in premenopausal and postmenopausal women, and hormone-sensitive tissues should be closely studied. To conclude, Use of Shilajit into day-to-day use need more clinical evidence with intensive trials, sophisticated delivery plans, and concern about regulatory and sex-related aspects.

ACKNOWLEDGMENTS

The Authors are thankful to the Herbified Research Foundation for providing the necessary facilities to execute the work.

FUNDING

This study was funded by Herbified Research Foundation

CONFLICT OF INTEREST: There is no conflict of interest.

REFERENCES

1. Quazi RS, Chougule V, Shinde MU, et al. A Powerful Molecule of Ayurveda Science. Pharmacognosy Res 2023;15:455–61. https://doi.org/10.5530/pres.15.3.046.
2. Williamson EM. Shilajit in Perspective 2009.
3. Frolova LN, Kiseleva TL. Chemical composition of mumijo and methods for determining its authenticity and quality (a review). Pharm Chem J 1996;30:543–7.
4. Kamgar E, Kaykhaii M, Zembrzuska J. A comprehensive review on Shilajit: what we know about its chemical composition. Crit Rev Anal Chem 2025;55:461–73.
5. Qadir A, Ali A, Singh T. Phyto-Therapeutic Potential and Pharmaceutical Impact of Shilajit (Asphaltum punjabianam): Current Research and Future Prospects 2024.
6. Mishra T, Dhaliwal HS, Singh K, et al. Shilajit (Mumie): Current status of biochemical, therapeutic and clinical advances. Curr Nutr Food Sci 2019;15:104–20.
7. Biswas TK, Pandit S, Mondal S, et al. Clinical evaluation of spermatogenic activity of processed

Shilajit in oligospermia. Andrologia 2010;42:48–56. https://doi.org/10.1111/J.1439-0272.2009.00956.X.

8. Mitchnick MA, Fairhurst D, Pinnell SR. Microfine zinc oxide (Z-cote) as a photostable UVA/UVB sunblock agent. J Am Acad Dermatol 1999;40:85–90.
9. Pickart L, Vasquez-Soltero JM, Margolina A. The human tripeptide GHK-Cu in prevention of oxidative stress and degenerative conditions of aging: implications for cognitive health. Oxid Med Cell Longev 2012;2012:324832.
10. RAFFERTY TS, McKENZIE RC, HUNTER JAA, et al. Differential expression of selenoproteins by human skin cells and protection by selenium from UVB-radiation-induced cell death. Biochemical Journal 1998;332:231–6.
11. Das A, S. El Masry M, Gnyawali SC, et al. Skin Transcriptome of Middle-Aged Women Supplemented With Natural Herbo-mineral Shilajit Shows Induction of Microvascular and Extracellular Matrix Mechanisms. J Am Coll Nutr 2019;38:526–36. https://doi.org/10.1080/07315724.2018.1564088.
12. Neltner TJ, Sahoo PK, Smith RW, et al. Effects of 8 Weeks of Shilajit Supplementation on Serum Pro-c1α1, a Biomarker of Type 1 Collagen Synthesis: A Randomized Control Trial. J Diet Suppl 2024;21:1–12. https://doi.org/10.1080/19390211.2022.2157522,.
13. Reilly DM, Lozano J. Skin collagen through the lifestages: Importance for skin health and beauty. Plast Aesthet Res 2021;8:N-A.
14. Labrozzi A. Nutrients in hair supplements: evaluation of their function in hair loss treatment. Hair Ther Transplant 2020;10:1–6.
15. Acharya SB, Frotan MH, Goel RK, et al. Pharmacological actions of Shilajit. Indian J Exp Biol 1988;26:775–7.
16. Mohammed RK, Taha HSM, Abid QH, et al. The effect of shilajit herb on sexual hormonal level in male and female in karbala province. Journal of Advance Multidisciplinary Research 2025;4:41–6.
17. Mosavi S, Tabarrai M, Tansaz M, et al. Effects of oral Shilajit tablets on sexual function and sexual quality of life among reproductive-aged women: a triple-blind randomized clinical trial. Traditional Medicine Research 2023;8:66.
18. Kumari VH, Sarashetti RS, Hadimur KS, et al. Effect of herbo-mineral formulation (Shilajatu Rasayana) in letrozole-induced polycystic ovarian syndrome. BLDE University Journal of Health Sciences 2016;1:108–12.
19. Tripathi P, Gupta P. MANAGEMENT OF PCOD/PCOS THROUGH AYURVEDA–A 2024.
20. Kanis JA. Estrogens, the menopause, and osteoporosis. Bone 1996;19:185S-190S.
21. Pingali U, Nutalapati C. Shilajit extract reduces oxidative stress, inflammation, and bone loss to dose-dependently preserve bone mineral density in postmenopausal women with osteopenia: A randomized, double-blind, placebo-controlled trial. Phytomedicine 2022;105:154334. https://doi.org/10.1016/J.PHYMED.2022.154334.
22. Sadeghi SMH, Hosseini Khameneh SM, Khodadoost M, et al. Efficacy of Momiai in Tibia Fracture Repair: A Randomized Double-Blinded Placebo-Controlled Clinical Trial. Journal of Alternative and Complementary Medicine 2020;26:521–8. https://doi.org/10.1089/ACM.2019.0453;SUBPAGE:STRING:ABSTRACT;ISSUE:ISSUE:10.1089/ACM.2020.26.ISSUE-6;WGROUP:STRING:PUBLICATION.
23. Saqib M, Kausar S, Akhtar S. Effect of Shilajit on lipid profile of hyperlipidemic albino rats and comparison with simvastatin 2013.
24. Trivedi NA, Mazumdar B, Bhatt JD, et al. Effect of shilajit on blood glucose and lipid profile in alloxan-induced diabetic rats. Indian J Pharmacol 2004;36:373–6.

25. Keller JL, Housh TJ, Hill EC, et al. The effects of Shilajit supplementation on fatigue-induced decreases in muscular strength and serum hydroxyproline levels. J Int Soc Sports Nutr 2019;16:3. https://doi.org/10.1186/S12970-019-0270-2.
26. Martinez V, McAngus K, Dickerson BL, et al. Effects of 12 Weeks of Chromium, Phyllanthus emblica Fruit Extract, and Shilajit Supplementation on Markers of Cardiometabolic Health, Fitness, and Weight Loss in Men and Women with Risk Factors to Metabolic Syndrome Initiating an Exercise and Diet Intervention: A Randomized Double-Blind, Placebo-Controlled Trial. Nutrients 2025;17:2042.
27. Andrade V, Wong-Guerra M, Cortés N, et al. Scaling the andean shilajit: a novel neuroprotective agent for alzheimer's disease. Pharmaceuticals 2023;16:960.
28. Khaksari M, Mahmmodi R, Shahrokhi N, et al. The Effects of Shilajit on Brain Edema, Intracranial Pressure and Neurologic Outcomes following the Traumatic Brain Injury in Rat. Iran J Basic Med Sci 2013;16:858.
29. Carrasco-Gallardo C, Farías GA, Fuentes P, et al. Can nutraceuticals prevent Alzheimer's disease? Potential therapeutic role of a formulation containing shilajit and complex B vitamins. Arch Med Res 2012;43:699–704.
30. Barouji SR, Shahabi A, Torbati M, et al. Mummy induces apoptosis through inhibiting of epithelial-mesenchymal transition (EMT) in human breast cancer cells. Galen Medical Journal 2020;9:e1812.
31. Kordestani Z, Melki E, Vahidi R, et al. Modulation of IKK/NF-κB Signaling: A Therapeutic Mechanism of Shilajit in Breast Cancer Cells. Journal of Kerman University of Medical Sciences 2024;31:66–71.
32. Asadi Z, Jalilian S, Arkan E, et al. How Shilajit-Based Nanocarriers Alter Classical Doxorubicin Delivery to Breast Cancer Cells (MCF-7 and ZR-75-1). ACS Med Chem Lett 2024;15:449–56. https://doi.org/10.1021/ACSMEDCHEMLETT.3C00538/SUPPL_FILE/ML3C00538_SI_001.PDF.
33. Perumal P, Sathakkathulla NA, Kumaran K, et al. Green synthesis of zinc oxide nanoparticles using aqueous extract of shilajit and their anticancer activity against HeLa cells. Sci Rep 2024;14:1–11. https://doi.org/10.1038/S41598-024-52217-X;SUBJMETA=631,639,67,925;KWRD=CANCER,NANOSCIENCE+AND+TECHNOLOGY.
34. Kazmi SL, Abbas Z, Javed U, et al. Electrospun polyvinyl alcohol/carboxymethyl cellulose loaded with Asphaltum Punjabianum (Shilajit) nanofibrous mats for potential cartilage regeneration applications. Int J Biol Macromol 2025:145719. https://doi.org/https://doi.org/10.1016/j.ijbiomac.2025.145719.
35. Bahri N, Dashti S, Mohammadzadeh F, et al. Shilajit versus placebo in the management of patients with moderate coronavirus disease 2019: A triple-blind randomized controlled trial protocol. Adv Integr Med 2025;12:100496. https://doi.org/https://doi.org/10.1016/j.aimed.2025.100496