Types of headache and those remedies in traditional persian medicine

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ABSTRACT

The history of headache, as a common neurological complication, goes back to almost 9000 years ago. Many ancient civilizations present references to headaches and the coherent treatment strategies. Accordingly, several documents comprising headache complications embodying precise medical information stem from Traditional Persian Medicine (TPM) that can provide useful opportunities for more comprehensive treatment. We conducted a survey on headache through original important pharmacopeias and other important medical manuscripts of TPM which were written during 9th to 19th centuries and have derived all headache categories and herbal remedies. An extensive search of scientific data banks, such as Medline and Scopus, has also been exercised to find results relating to the anti-inflammatory, anti-nociceptive, and analgesic effects of denoted medicinal herbs. The concept of headache and treatments in TPM covers over 20 various types of headache and more than 160 different medicinal plants administered for oral, topical, and nasal application according to 1000 years of the subject documents. Nearly, 60% of remarked medicinal herbs have related anti-inflammatory or analgesic effects and some current headache types have similarities and conformities to those of traditional types. Beside historical approaches, there are many possible and available strategies that can lead to development of new and effective headache treatment from medicinal plants so that this study can provide beneficial information on clinical remedies based on centuries of experience in the field of headache which can stand as a new candidate for further investigations.

Key words: Headache, medicinal plant, traditional persian medicine

INTRODUCTION

Headache is one of the most common neurological complications in the general population. The global reported percentage of headache prevalence is 47%[¹] and it is the fifth most common primary complaint of patients in the USA.² Overall, 96% of people experience headache in their whole life and also the prevalence in females is higher than in males.³

Headache is a symptom of various diseases which has a history close to mankind creation.⁴ The 9000-year-old Neolithic skulls having trepanation may show the first evidence of headache treatment.⁵ Ancient Egyptian medicine, such as the Ebers Papyrus (1550 B.C.) and others present references to headaches, migraine, and neuralgia.⁶ Before Galen, headaches were classified into three main types as Cephalalgia (A mild and short-term headache), Cephelea (a type of headache that is chronic and severe), and Heterocrania which is a paroxysmal headache on one side of the head.⁷ A new method of treatment was suggested by Galen (129-199 A.D.) by which an electric torpedo fish was applied to the forehead of patient.⁸

Headache treatment in traditional Persian medicine (TPM) goes back to the 6th century BC; however, most findings are from the medieval period. In that era, physicians observed and diagnosed different headache types and assembled much information on traditional remedies from ancient Greece, Egypt, India, and China to fulfill their own innovative treatment sources.⁹,¹⁰

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Documents of headache subject from TPM have precise medical information on different types and treatments of this disorder. Therefore, this survey has been done to present headache types and remedies during 1000 years in Persia and hope to provide useful opportunities for more comprehensive treatment.

MATERIALS AND METHODS

We have studied printed edition of six original important treatises of TPM, namely The Liber Continens by Rhazes (9th and 10th centuries), Alabniab an haghaeb ol-advieh by Aboo mansour Heravi (11th century), The Canon of Medicine by Avicenna (10th and 11th centuries), Ikhtiyaret-e-Badyee by Zein al-Din Attar Ansari Shirazi (14th century), Tohfat ol Moemenin by Mohammad Tonkaboni (17th century), and Makbzan ol Advieh by Aghili-Shirazi (18th century). [9-14] These are among the most important references and comprehensive pharmacopoeias for TPM and also have been widely used by natural healers of Iran. [9] We studied these pharmacopoeias for exact term of headache (soda’a), and gathered recommended herbal remedies in a distinct table. [9-14] Other books such as “Matching the Old Medicinal Plant Names with Scientific Terminology,” “Dictionary of Medicinal Plants,” “Dictionary of Iranian Plant Names,” “Popular Medicinal Plants of Iran,” “Pharmacographia Indica,” “Indian Medicinal Plants,” “Seydaneh fi Teh,” and botanical descriptions of Makbzan-o-Advieh were studied for nomenclature of medicinal plants.

On the other hand, headache classification, terminology, and additional descriptions were derived from other Persian medical manuscripts such as Al-aghraz al-tebbieh va al-mabahes al-alayieb (12th century), Kholasat-al-Tajarob (16th century), Tebb-e-Akbari (18th century), and Eksir-e-Azam (19th century). [22-25] These books which are as clinical texts of TPM cover the Persian Medicine language for nearly 1000 years and show the procedure of improving the traditional medicine in this region.

TPM strategy for headache treatment is almost relieving pain and inflammation. Therefore, for each herbal remedy, we have done an extensive search of scientific data banks such as Medline and Scopus to find results concerning the anti-inflammatory, anti-nociceptive, and analgesic effects.

RESULTS

Persian physicians used the term “soda’a” to describe headache. Various classifications and plenty of natural remedies have been described in TPM. In fact, more than 20 types of headache have been noted in TPM which are listed and described in Table 1. This classification was an important element in designing the therapeutic strategy. Also 181 medicinal plants identified to cure this disorder are mentioned among investigated medical manuscripts. Among these plants, 166 herbs belonging to 77 families are identified and presented in Table 2. The most cited families with useful plants for headache treatment were Asteraceae and Lamiaceae. We omitted plants which were not identifiable. Moreover, common traditional name, route of administration, headache types which can be cured by these reported medicinal plants, and related effects which are analgesic or anti-inflammatory properties are noted. Moreover, similar current types of headache are included in both tables.

DISCUSSION AND CONCLUSION

Persian physicians collected and developed ancient knowledge from other cultures and add them to their experience. The information from selected texts of Persian medicine is gathered from different centuries. Remedies have increased in number and quality of descriptions and show that TPM has significant growth in these 1000 years. TPM presented precise and typical description of headache types and classification [Table 1]. It believes that sudden or irregular alteration of Dam (blood), Balgham (phlegm), Safra (yellow bile), and Sauda (black bile) may cause headache and should be balanced. Moreover, it is noted that headache may originate from dissociation of brain connections. [25-26]

Although herbal medicine was the most common therapeutic strategy for headache in TPM, other natural medicines such as animal and mineral drugs and special therapeutic strategies such as cupping and venesection have been noted that is beneficial in headache treatment. [14,25] Therapeutic effects of those medicinal plants are attributed to specific analgesic, sedative, or anti-inflammatory properties. [7] Medicinal herbs with the application of more than 1000 years of TPM strategy are presented in Table 2. The related analgesic or anti-inflammatory effect of about 60% of reported medicinal plants shows that the main objective for headache therapy in TPM is to relieve the pain and inflammation. Moreover, treatment and correction of temperament alteration with plants having contrary temperament is the other therapeutic strategy [25,26] which has no similarity to modern pharmacology. Therefore, continuing the research is necessary to elucidate the pharmacological activities of herbal remedies being used to treat headache disorders.

Besides variety of plants for treatment, route of administration and dosage forms in TPM are interesting. Plants have been prepared and administered as topical, oral, and nasal dosage forms. The most administered dosage form was topical, while ease of application and patient compliance are additional reasons in considering topical dosage forms. In this application, plants were mixed with vinegar, olive oil, rose oil, barley flour, albumen, herbal juices or milk to increase penetration, decrease unwanted effects, or dilute potent substances. [7,25,26]
Table 1: Most commonly traditional headache classification and description

| Headache traditional type | Short description in TPM[^22-26] | Current type(s)/condition(s) |
|---------------------------|----------------------------------|-----------------------------|
| Simple headache (Sodaa-e-Saza) | Caused by internal or external physicochemical and psychological conditions like extra exposure to sun or heat, exercise, anger, cold weather, starving | Tension type headache may be occurring in similar conditions |
| (Hot, cold, wet, dry) | | |
| Corporal headache (Sodaa-e-Maaddi) | Caused by imbalance in four elements with a rise of humors | - |
| (Sanguinary, Billiary, Phlegmatic, Melancholic) | | |
| Alcohol-induced headache (Sodaa-e-khomaan) | It is caused following excessive alcohol or wine drinking | Alcohol-induced headache |
| Bilateral headache (Bayze) | Recurrent headache with severe pain attacks | Near to cluster headaches |
| Catarhal headache (Sodaa-e-nazil) | Catarhal is a typical symptom that may be incorporated with this type. Moreover, aching pain and sensation of a heavy weight in the forepart of the head may be distinguished | Compatible with sinusitis or headaches during common cold |
| Congestive headache (Sodaa-e-saddi) | Resulting from congestion or blockage in brain pathways having blood accumulation | - |
| Critical headache (Sodaa-e-bohrani) | It is associated with fever and is accompanied by epistaxis | - |
| Desiccative headache (Sodaa-e-yobsi) | It occurs when body is at odds with excessive dryness and may be associated with apnea | - |
| Fluting headache (Sodaa-e-Bokhaari) | Like Migrant headache but with no moving pain | - |
| Headache due to smell (Sodaa-e-shammi) | Odors can affect brain and cause headache | - |
| Helmet headache (Khooze) | Pain covers the whole head like a galea or helmet | - |
| Inflammatory headache (Sodaa-e-varami) | It is associated with inflammation in brain membranes like encephalitis or meningitis | Occurs in brain abscess, sinusitis, encephalitis or meningitis conditions |
| Migrant headache (Sodaa-e-Rihi) | With pain movement through different parts of the head. Tinnitus, head lightness and also nasal dryness must be distinguished in this type | - |
| Orgasmic headache (Sodaa-e-jemaaee) | It is explosive and severe during or after intercourse | Sexual or coital headache |
| Participatory headache (Sodaa-e-sherki) | It is associated with other organs (stomach, uterine, liver, spleen and musculoskeletal system may be accompanied). Headache is mostly in occipital part of the head | - |
| Post-Traumatic headache (Sodaa-e-zarbi) | Head trauma or injuries may predispose the patient to this type of headache | Compatible with post-traumatic headache |
| Pulsating headache (sodaa-e-zarabaani) | It is defined by existence of pulse around painful areas | Near to types with pulsating feeling |
| Sleep caused headache (Sodaa-e-nowmi) | It is caused after sleep or that wakes the sufferer from sleep | Hypnic headache |
| Symptomatic headache (Sodaa-e-arazi) | Caused by systemic disease, neurological disorders | Symptomatic (reflex) headaches |
| Unilateral headache (Shaghighe) | Recurrent unilateral headache with frequent attacks, with or without palpitation, nausea, vomiting, photophobia | Compatible with basilar migraine |
| Vermicular headache (Sodaa-e-doodi) | Caused by parasites in cerebral cavities | - |

[^TPM]: Traditional Persian Medicine

Another route for drug administration is nasal application which has been significantly applied in headache treatment in TPM. This route is a potentially alternative route for systemic drug bioavailability in parenteral restricted administration.[27] Easy absorption, rapid onset of action, desirable penetration, avoidance of hepatic first pass effect, and potential for direct drug delivery to the CNS via the olfactory region are some benefits of this kind of drug delivery system which has an important place in modern pharmaceutical sciences.[28-30] Besides oral or topical application, 47 medicinal plants have been applied nasally for headache treatment and specifically 15 medicinal plants were just administered through this route [Table 2]. This amount of nasally cited medicinal herbs can show that this novel route was fully considered by Persian practitioners.

Although 85 reports on medicinal herbs were related to general headache, other types of headache such as unilateral, chronic, and also headache due to imbalanced humor (sanguinary, biliary, phlegmatic, and melancholic headaches) have various plants to be cured by [Table 2]. Chronic headache with prevalence average rate up to 4% in today’s general population[31] may have no exact TPM description similar to modern medicine, but can be a good candidate for various herbal medications which are noted in Table 2.

In part of headache classification [Table 1], although conformity of traditional headache types with novel classification is not perfect but some denoted headaches such as unilateral, bilateral, sexual, hypnic, pulsating,
Table 2: Headache types and medicinal plants for treatment

| Plant family | Plant scientific name | Persian name | Form(s)* | Part(s)* | TPM headache type(s) | Activity(s)* | Texts* |
|--------------|-----------------------|--------------|-----------|----------|----------------------|--------------|--------|
| Adiantaceae  | Adianthum capillus-veneris L. | Barsaavashaan T | Lf | Cold, general | A[61] | 5,6 |
| Amaranthaceae | Amaranthus blitum L. | Baghle-yamaani T | Ap | Sun caused | - | 2,5,6 |
| Apocynaceae  | Nerium oleander L. | Defil T | Lf | General | A[60] | 5,6 |
| Araliaceae   | Hedera helix L. | Ashaghe N | Ap | Chronic | A[62] | 2 |
| Areceae      | Phoenix dactylifera L. | Kofarri O, T | Fr | Hot | A[59] | 5,6 |
| Asteraceae   | Achillea millefolium L. | Hozonbol N, O | Ap | Chronic, general | A[60] | 5,6 |
| Aristolochiaceae | Aristolochia indica L. | Zaravand O, T | Rl | Phlegmatic, unilateral | A[59] | 5,6 |
| Asteraceae   | Asarum europaeum L. | Asaaroon N | Ap | Phlegmatic | A[60] | 5,6 |
| Brassicaceae | Brassica nigra (L.) Koch. | Khardal T | Sd | Sun caused | A[64] | 5,6 |
| Burtonaceae  | Chenopodium ambrosioides L. | Khoshbodeh T | Ap | General | A[60] | 5,6 |
| Caesalpinaceae | Caesalpinia pulcherrima L. | Khoshehbeh T | Lf | Phlegmatic, unilateral | A[60] | 5,6 |
| Capparaceae  | Capparis spinosa L. | Sanaa T | Rl | Sun caused | A[69] | 5,6 |
| Caryophyllaceae | Agrostemma sp. | Khorrrom N, O | Lf | General | A[62] | 5,6 |
| Chironoideae | Chironia quinquefolia L. | Zanar T | Lf | General, unilateral | A[60] | 5,6 |
| Cucurbitaceae | Cucurbita pepo L. | Ghasad N, O | Ft | Cold, general | A[70] | 5,6 |
| Costaceae    | Costus officinalis L. | Kharb T | Lf | General | A[60] | 5,6 |
| Cruciferae   | Brassica nigra (L.) Koch. | Khardal T | Sd | Sun caused | A[64] | 5,6 |
| Cytisaceae   | Cytisus multiflorus L. | Lauzan T | Lf | General | A[62] | 5,6 |
| Cucurbitaceae | Citrullus colocynthis (L.) Schrad. | Ghasad N, O | Lf | General, hot | A[70] | 5,6 |

Contd...
| Plant family | Plant scientific name | Persian name | Form(s) | Part(s) | TPM headache type(s) | Activity(s) | Texts |
|-------------|----------------------|--------------|---------|---------|----------------------|-------------|-------|
| Cupressaceae | Cupressus sempervirens L. | Sarv | T | Ft | Cold, unilateral | - | 6 |
| Cuscutaceae | Cuscuta epithymum L. | Aftimun | O | Ap | Participatory | - | 6 |
| Cyperaceae | Cyperus rotundus L. | Od | O, T | Rt | Cold | - | 5,6 |
| Elaeagnaceae | Elaeagnus angustifolia L | Ghobearaa | O | Ft | Fluting, participatory | AN[77] | 5,6 |
| Euphorbiaceae | Ricinus communis L. | Kherva | O | Sd | General | A[76] | 6 |
| Fabaceae | Alhagi maurorum Medik. | Haaj | N | Ap | Chronic | Al, AN[42] | 5,6 |
| | Anagyrus foetida L. | Anaaghares | O | Lf | General, cold | - | 5,6 |
| | Astragalus hamulos L. | Ekkilolmalek | O, T | Ap | General, cold | A[79] | 2,4,5,6 |
| | Glycyrrhiza glabra L. | Sus | O | Rt | Chronic, unilateral | A[81] | 5,6 |
| | Lablab purpureus (L.) Sweet | Lablaab | N, O | Ap | Chronic, general | - | 2,4,5,6 |
| | Lupinus termis L. | Termes | O | Sd | Chronic | - | 5,6 |
| | Vigna mungo (L.) Hepper. | Maash | O | Sd | Hot | - | 5,6 |
| | Gentianaceae | Erythraea centaurium Rafn. | Ghantariun | T | Rt | Sun caused, wine caused | Al, A[82] | 5 |
| Hamamelidaceae | Liquidambor orientalis Mill. | Meiey-ee-saalee | N | Gm | General | - | 5 |
| Hyacinthaceae | Hyacinthus orientalis L. | Zafaraan | T | Fr | Cold, general | Al, AN[83] | 3,5,6 |
| Iridaceae | Crocus sativus L. | Sonbol | N | Fr | General, unilateral | - | 1 |
| | Iris spp. | Irsaa | T, N | Lf, Rt | Chronic, unilateral | - | 2,3,4,6 |
| Juglandaceae | Juglans regia L. | Jowz | T | Bk, Ft | Chronic, unilateral | Al, AN[85] | 5,6 |
| Lamiaceae | Lavandula angustifolia Mill. | Khazaamaa | O | Fr | General | Al, AN[85] | 5 |
| | L. stoechas L. | Ostokhoddoos | O | Ap | Cold | - | 5 |
| | Marrubium alysson L. | Aains | O | Ap | General | - | 5,6 |
| | Mentha piperita L. | Nanaa | T | Lf | Cold | Al, AN[42] | 2,4,5,6 |
| | Ocimum basilicum L. | shaaheferam | N, O | Lf | General | AN[86] | 4,5,6 |
| | O. pilosum Wild. | Faranjmeshk | N, O, T | Lf | Cold | - | 5,6 |
| | Origanum majorana L. | Marzanjoosh | O | Ap | Melancholic, migrant | - | 6 |
| | Teucrium montanum L. | Marmaahooz | N | Ap | Cold | - | 2,3,6 |
| | T. polium L. | Joade | T | Ap | Wet | AN[86] | 6 |
| | Thymus serpyllum L. | Sisanbar | T | Lf | General, hot | - | 2,3,4,6 |
| | Vitex agnus-castus L. | Banj angosht | T, Fr | Ft | General | A[86] | 2,4 |
| | Laurus nobilis L. | Ghaar | O | Sd | Phlegmatic | Al, A[89] | 6 |
| | Lauraceae | Cinnamomum camphora L | Kaafoor | N, T | Lx | Hot | A[87] | 1,2,3,6 |
| | C. iners Reinw. and Bl. | Salikhe | T | Bk | Cold | A[88] | 6 |
| | C. zeylanicum L. | Darchin | T | Bk | Cold | Al, AN[42] | 6 |
| | Liriope muscari L. | Ghaar | O | Sd | Phlegmatic | Al, A[89] | 6 |
| | Liliaceae | Aloe vera L. | Sebr | T | Lf | General | AN[90] | 2,4,5,6 |
| | Colchicum autumnale L. | Sooranjaan | N | Fr | Cold | Al, A[91] | 3,5,6 |
| | Lilium sp. | Soosan | T | Ap | General | - | 5 |
| | Smilax aspera L. | Oshbe | N | Fr | Cold, unilateral | - | 6 |
| | Urginea maritima (L.) Baker | Esghool | O | Rt | Cold, unilateral | - | 6 |
| | Linum usitatissimum L. | Kataan | T | Sd | General | A[92] | 5,6 |
| | Lythraceae | Lawsonia inermis L. | Hanaa | T | Lf | Bilateral, unilateral | Al, A[93] | 5,6 |
| | Malvaceae | Adansonia digitata L. | Habhaboo | O | Ft | Hot | Al, A[94] | 5,6 |
| | Corchorus olitorius L. | Malookhia | T | Fr | Hot | - | 3 |
| | Malva rotundifolia L. | Khatmi | T | Fr | Unilateral | - | 3 |
| | Meliaceae | Azadirachta indica L.C. Juss | Neem | N | Lf | General | AN[95] | 6 |
| | Myrica species | Daar shisheaan | O | Bk | Cold | - | 5,6 |
| | Myristicaceae | Myristica fragrans Houtt. | Basbaase | N | Ft | Phlegmatic | A[96] | 1,6 |
| | Nymphaeaceae | Nelumbo nucifera Gaertn | Oosbeed | O | Rt | General | A[97] | 6 |
| | Nymphaea alba L. | Niloofar | N, O | Fr | Participatory, traumatic | A[98] | 6 |
| | Oleaceae | Olea europaea L. | Zeytoon | O, T | Ap | General, unilateral | Al, AN[99] | 5,6 |

Contd...
| Plant family      | Plant scientific name                      | Persian name             | Form (s)a | Part (s)b | TPM headache type (s) | Activity (s)c | Texts d |
|-------------------|--------------------------------------------|--------------------------|-----------|-----------|----------------------|---------------|---------|
| Oxalidaceae       | Oxalis acetosella L.                       | Hommas                   | T         | Sd        | General              | -             | 5,6     |
| Paoniacae         | Paonia officinalis L.                      | Faavaaniea               | O         | Rt        | General              | -             | 6       |
| Papaveraceae      | Glaucium concinumutum L.                   | Maamisa                  | T         | Ft        | General              | -             | 5,6     |
|                   | Papaver somniferum L.                      | Afyoon                   | N, T      | Bk, Lx    | General, hot         | A[101]        | 1,2,5,6 |
| Pedaliaceae       | Sesamum indicum L.                         | Samsam                   | O         | Sd        | General              | A[102]        | 5       |
|                   |                                            |                          | T         |           | Hot, sun caused      |               | 2,4     |
| Pinaceae          | Cedrus libani Barrel. and Loudon           | sharbeenee               | T         | Lx        | Cold, unilateral      | -             | 2,3,5   |
|                   |                                            |                          |           |           |                      |               |         |
| Piperaceae        | Piper cubea L.                             | Kabaabe                   | O         | Ft        | Hot                  | Al, AN[103]   | 5,6     |
| Plantaginaceae    | Plantago ovata Forsk                       | Bazro ghtoonaa           | T         | Sd        | General              | A[104]        | 6       |
|                   |                                            |                          |           |           | Hot                  |               | 2,5,6   |
| Poaceae           | Hordeum vulgare L.                         | Jow                      | O         | Sd        | General, hot         | -             | 5       |
|                   |                                            |                          | T         |           | Billary, fluting      |               | 6       |
|                   | Loliem temulentum L.                       | Zavaan                   | T         | Sd        | Cold                 | -             | 5,6     |
|                   | Orzya sativa L.                            | Berenj                   | O         | Sd        | Dry                  | -             | 5,6     |
| Polygonaceae      | Rheum palmatum L.                          | Raavand                  | O         | Rt        | Cold, unilateral      | -             | 5,6     |
| Portulacaceae     | Portula olerea L.                          | Khorfe                   | T         | Ap        | General, hot, pulsating | Al, A[105]     | 1,4,5,6 |
| Primulaceae       | Cyclamen europaeum L.                      | Bokhumaryam              | N, T      | Ap        | Cold                 | -             | 1,2     |
| Puniceae          | Punica granatum L.                         | Rommaan                  | O         | Ap        | Hot                  | A[106]        | 1       |
| Ranunculaceae     | Clematis ochroleuca Dill. and L.           | Zayyan                   | N         | Fr        | General, unilateral  |               | 5,6     |
|                   |                                            |                          | N, T      | Fr        | General              |               |         |
| Rosaceae          | Helleborus niger L.                        | Kharbagh asvd            | O         | Rt        | General, unilateral  | -             | 1,3     |
|                   | Nigella sativa L.                          | Shoneez                  | N         | Sd        | Cold, chronic        | A[107]        | 5,6     |
|                   |                                            |                          | T         |           | Cold                 |               | 2,4     |
|                   | Crataegus azarolus L.                      | Zoaaro                   | O         | Ft        | Hot                  | -             | 5,6     |
|                   | Cydonia oblonga Mill.                      | Safarjal                 | O         | Ft        | Chronic, hot         | -             | 5,6     |
|                   | Potentilla reptans L.                      | Ghantafeloone            | O         | Lf        | General              | -             | 2       |
|                   | Prunus amygdalus L.                        | Lawz-al-morr             | T         | Ft        | Cold, general        | -             | 2,3,4,5,6 |
|                   | Prunus domestica L.                        | Ejjas                    | O, T      | Fr, Ft    | Hot                  | -             | 5,6     |
|                   | P. persica (L.) Batsch.                    | Khoohk                   | T         | Sd        | Cold, unilateral      | -             | 2       |
|                   | Rosa canina L.                             | Nasreen                  | T         | Fr        | General              | Al, AN[108]   | 2,6     |
|                   | R. damascena Mill.                         | Vard abhar               | N, T      | Fr        | General              | Al, A[106]    | 2,5,6   |
|                   |                                            |                          | O         |           | General, unilateral  |               | 6       |
| Rubiaceae         | Coffea arabica L.                          | Bon                      | O         | Ft        | General              | -             | 5,6     |
| Rutaceae          | Ruscus aculeatus L.                        | Aas barri                | O         | Ap        | Phlegmatic           | A[110]        | 5,6     |
| Salicaceae        | Salix aegyptica L.                         | O. T. Khalaaf-al-balkhi  | O, T      | Lf        | General              | -             | 5,6     |
| Santalaceae       | Santalum album L.                          | Sandal                   | T         | Sk        | General              | -             | 1,2,3,6 |
| Sapindaceae       | Sapindus trifolius L.                      | Rateh                    | N         | Ap        | General, unilateral  | AN[113,114]   | 2,4     |
| Solanaceae        | Datura stramonium L.                       | Jowz-ol-maassel          | O, T      | Fr        | Billary, chronic     | AN[115]       | 5,6     |
|                   | Hyoscyamus niger L.                        | Bang                     | T, N      | Ap        | Chronic, hot         | Al, AN[116]   | 5,6     |
|                   | Mandragora officinarum L.                  | Lofah                    | T, N      | Ft, Lf    | General, hot, sanguinary | -             | 4,5,6   |
|                   | Solarum cordatum Forsk.                    | Hodoghi                  | T         | Rt        | General, unilateral  | -             | 6       |
|                   | S. melongena L.                            | Baadenjian               | O         | Ft        | Hot                  | A[117]        | 5       |
|                   | S. nigram L.                               | Enab-ol-salab            | T         | Lf        | General              | Al, A[118]    | 2,6     |
| Taxaceae          | Taxus baccata L.                           | Zaranb                   | N         | Ap        | Cold                 | Al, AN[119]   | 2,4,5,6 |
| Theaceae          | Camellia sinensis (L.) Kuntze              | Chaay khataai            | O         | Lf        | Cold                 | A[120]        | 6       |
| Verbeneaceae      | Tectona grandis L.                         | Sajj                     | T         | Ft        | Hot                  | Al, A[121]    | 5,6     |
| Violacea          | Viola odorata L.                           | Banafsej                 | N, T      | Fr        | Hot                  | A[122]        | 2,3,5,6 |
|                   |                                            |                          | O         |           | Billary, sanguinary  |               | 1,6     |
| Vitaceae          | Vitis vinifera L.                          | Zabib                    | T         | Ft        | Hot, sun caused      |               | 2,4,6   |
|                   |                                            |                          | N, T      | Lf        | Billary, sanguinary  |               | 5       |
| Zingiberaceae     | Alpinia galanga (L.) Willd.                | Khoolanjahn              | O         | Rt        | General, cold        | A[123]        | 3,6     |
|                   | Elettaria cardamomum L.                    | Ghaaghole                | N, T      | Ap        | General              | -             | 2,4,5,6 |
|                   | Zingiber officinale Roscoe                 | Zanjebeel                | O         | Rt        | Cold, unilateral      | Al, A[124]    | 3       |
|                   | Z. zerumbet (L.) Roscoe and Sm.            | Zorabnaad                | T         | Rt        | General, unilateral  | AN[179]       | 3       |

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trauma-induced (post-traumatic), fasting, catarrrhal (headache attributed to rhino-sinusitis), inflammatory, and alcohol-induced headache are similar to those of modern medicine. Some headache types (simple headache such as hot, cold, wet, and dry headaches) in TPM classification can be related to weather and meteorological variables, starving, or other similar conditions. Described signs and symptoms of vermicular headache in TPM may conduct this type to the headache attributed to infection in International Classification of Headache Disorders. Another interesting concept in TPM for headache etiology is the participation of internal organs in accompanying the disorder (participatory headaches). The fact is not yet well determined, but the comorbidity of headache and gastrointestinal complications has been investigated and association between GI complaints and chronic headache may need to be considered.

Obviously, there are many possible and available strategies that can lead to develop new and effective headache treatment from medicinal plants. Beside historical clarification, this study can provide comprehensive data on clinical remedies based on centuries of experience in the field of headache and thus might lead to perform further clinical trials of these remedies for the treatment of cephalic pain.

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