

## Original Research Article

### **Medicinal plants traditionally used for the treatment of skin diseases in Southern Punjab, Pakistan**

#### **ABSTRACT**

Skin conditions are among the most common health problems that affect people. Modern, allopathic, and natural medicine can all help to promote healthy skin. Human skin problems can be successfully treated using medicinal herbs because they contain a wide variety of bioactive molecules. The goal of this research is to look into the dermatological properties of medicinal plants used by different ethnic communities in southern Punjab, Pakistan and it seeks to establish a foundation for the development of novel medications with anti-skin activity. The snowball sampling method was employed for expert sampling in the southern Punjab districts of Multan and Vehari. Direct interviews with traditional herbalists (Hakeem) and shopkeepers selling medicinal plants (pansar) were done between August and December 2021. After gaining their prior informed agreement, 120 experts from southern Punjab were interviewed. 21 medicinal plants were recorded to be utilized in the treatment of skin problems. Plants are largely members of the Asteraceae and Piperaceae families. Leaves (62%) are the plant portion most frequently used as a treatment for skin conditions. Decoction (23%) is the most frequently used method in the study area. *Aloe barbadensis* miller having the highest Relative Frequency Citation (RFC) value while the frequency citation (FC) value ranged from 20 to 60. The highest value of FC was also recorded for *Aloe barbadensis*. The fidelity level (FL) ranged from 66 to 100%. The documented 15 medicinal plants have a higher FL value than 85%.

**Key Words:** Medicinal plants, Traditional knowledge, Skin disorders, Quantitative analysis, Southern Punjab, Pakistan

## 1. INTRODUCTION

Humans use plants to meet a variety of survival needs [1]. Plants give a variety of food products, fuelwood, timber, raw material for industries, and fodder but they are also a good source of herbal medicines for curing a variety of maladies [2]. Indigenous peoples have traditionally employed conventional medical practices [3]. Around 80% of Asian and African communities are considered to use traditional medicine for their healthcare requirements [3, 4]. Numerous ethnic groups rely on natural resources, particularly medicinal herbs. Herbal remedies have been utilized for the treatment, mitigation, prevention, and management of numerous diseases throughout the world since ancient times [5]. The uses of medicinal plant-based remedies are becoming popular day by day [6]. Herbal medication is the treatment method used by the majority of people living in rural regions in which medicinal plants are used as an alternative to allopathic therapy [7]. Allopathic drugs have more efficacy and give quick recovery when treating many diseases but they might have negative effects if administered incorrectly. Herbal medications are preferred due to their low cost, ease of availability, and lack negative effects [2].

In tropical countries, infectious illnesses are the primary cause of mortality [8]. This is partly due to the decreased efficacy of conventional treatments as a result of the rise of drug-resistant diseases, especially in developing countries [8]. The skin is the biggest organ in the human body and it is highly susceptible to a variety of changes that can cause skin damage in a variety of ways. Additionally, this barrier can be altered by pathogens, which can result in a variety of skin issues such as wounds, boil, acne, atopic dermatitis, shingles, hives, sunburn, contact dermatitis, diaper Rash, and general skin illnesses. As a result, skin conditions can seriously degrade health and provide a risk for mental health problems [9]. These health issues are faced by people of different ages and are estimated to account for 34% of all occupational diseases experienced [10]. Furthermore, dermatological disorders are many and ubiquitous because they are caused by different pathogens and specific symptoms are appeared on the skin. The effects caused by dermatological disorders are significant throughout the world [11]. The Global Burden of Disease (GBD) 2013 report showed that dermatological disorders are the eighteenth main reason for health problems worldwide [12, 13].

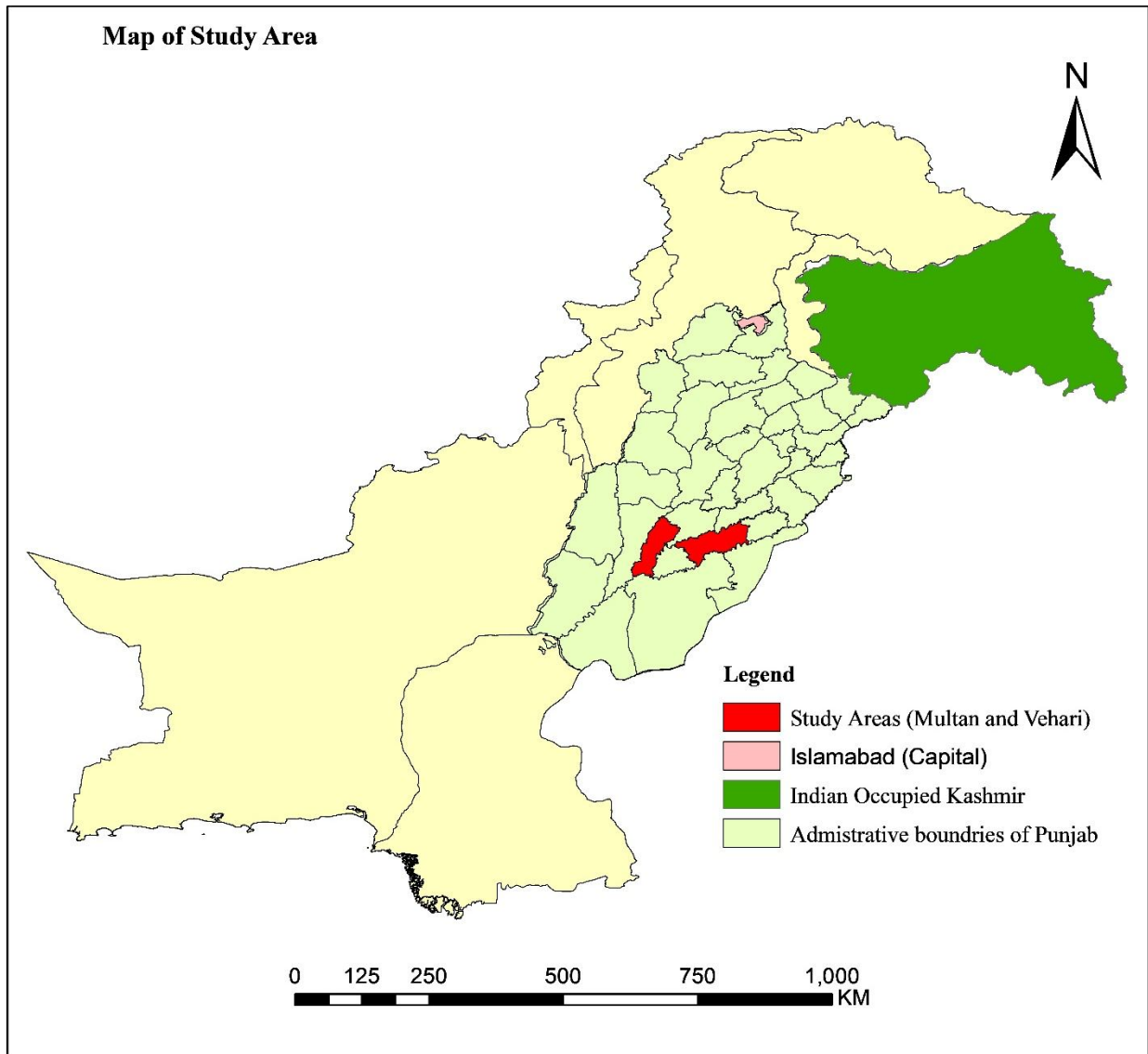
Treatment for any sickness, particularly for skin disorders, is necessary to reduce the burden brought on by skin diseases and to protect the healthy body of human beings. There are two medical systems in this regard: traditional medicine and conventional medicine. In the conventional medical system, various medications were already utilized for treating some symptoms associated with skin illnesses [14]. The hefty price tag and occasionally unfavorable side effects of these synthetic medications continue to raise suspicions even though they are successful in treating skin problems. Additionally, several chemical products have issues with allergy and resistance, which leads researchers to search for alternate solutions [15]. Natural medicines made from plants are becoming more and more popular as an alternative to traditional allopathic medications since they are easily accessible, safe, and affordable for the poor. In reality, it has been discovered that using conventional medicines, particularly botanicals, is crucial for treating skin infections [10]. In many nations across the world, plants were used to cure skin problems, greatly enhancing people's access to basic healthcare [16]. Herbal medication in a traditional way to cure different disorders including dermatological disorders is deeply ingrained in Pakistan. However, ethnobotanical investigations on the treatment of skin ailments in southern Punjab, Pakistan remained spatially scattered. Herbal practitioners in the study region are well-versed in the use of therapeutic herbs, but many are hesitant to share their expertise with others. However, this vital information is in danger of being lost by the next generation. Previous ethnomedical research had been conducted in surrounding locations, but this area remained undiscovered [17, 18, 19, 20, 21, 22, 23, 24, 25]. Therefore, this research was organized to investigate the wild plants used to cure skin disorders in the Multan and Vehari regions of Southern Punjab, Pakistan.

## **2. MATERIALS AND METHODS**

### **2.1. Study area**

This investigation was conducted in two main districts (Multan and Vehari) of Southern Punjab, Pakistan. The latitude and longitude of Multan district are approximately 30° 28' 16" North and 71° 43' 54" East while the latitude and longitude of Vehari district are approximately 30° 22' 21" North and 72° 58' 43" East as shown in Fig. 1. Multan has the distinction of being one of

Pakistan's oldest cities. Multan is relatively fertile and plain, with the Chenab River running through Tehsil Muzafargarh on the western side. The area has an arid environment with an average of 175mm rainfall annually and the highest temperature 52 degrees centigrade was recorded. District Vehari is situated between Nili Bar and the rivers Ravi, Sutlej, and Beas [24].



**Figure 1. Map of the study area**

## 2.2. Sampling and Ethnobotanical data collection

The snowball sampling method was employed for expert sampling. An open-ended interview was used followed by [26] and [27]. Before it was utilized in the study, the questionnaire was verified by experts, and a pilot study was conducted. Direct interviews with traditional

herbalists and pansar were done between August and December 2021. Each respondent was checked three to four times to make sure the information was correct. When there was a mismatch between the data previously provided and the information obtained on later visits to a specific plant, it was dismissed for being unreliable. Out of the 157 traditional respondents who were initially contacted.

### 2.3. Analysis of Quantitative Data using Indices

#### *Use Value (UV)*

To calculate the UV of all medicinal plants following formula is used as used by [28].

$$\frac{U.V \sum u}{4} = N$$

Where,  $u$  = The number of uses mentioned by each respondent;  $N$  = Total number of respondents involved in the study.

#### *Relative Frequency of Citation (R.F.C)*

The following formula was used to calculate the RFC as used by [29].

$$R.F.C = \frac{F.C}{N}$$

Where,  $F.C$  = The number of participants that report the uses of specific species;  $N$  = Total number of respondents involved in the current study.

#### *Fidelity level (FL)*

The following formula was used to calculate the FL as used by [30].

$$F.L (\%) = \frac{N.P}{N} \times 100$$

Where,  $N.P$  = The number of respondents that specify the use of species for a particular disease category;  $N$  = Total number of respondents that use them for any type of disease category.

## 3. RESULTS

### 3.1. Socio-demographic Information

Table 1 showed that 120 respondents (Hakeem and pansar) participated from the Multan and Khanewal districts of Southern Punjab. Participants age ranged from 20 to 100 years old, with 23% being young, 50% being middle-aged, and 27% being over 50. Thirty percent of the

participants were illiterate, 35% had completed elementary school, 18% had completed optional schooling, 9% had completed higher education, and just 8% had completed college. Half of the respondents are traditional health practitioners (Hakeem) while the remaining half are shopkeepers who have sold medicinal plants (Pansar). Most respondents lived in suburban (55%) and only 45% lived in urban areas of Multan and Khanewal districts.

**Table 1. Socio-demographic information of the respondents (n = 120)**

| Demographic Information | Divisions       | Frequency (f) | Percentage (%) |
|-------------------------|-----------------|---------------|----------------|
| Age                     | Young age       | 28            | 23%            |
|                         | Middle age      | 60            | 50%            |
|                         | Above 50 y      | 32            | 27%            |
| Education               | Illiterate      | 36            | 30%            |
|                         | Literate        | 84            | 70%            |
| Source of livelihood    | Hakeem          | 60            | 50%            |
|                         | Pansar          | 60            | 50%            |
| Locality                | Sub urban areas | 66            | 55%            |
|                         | Urban areas     | 54            | 45%            |

### 3.2. Documented medicinal plant species

21 medicinal plants belonging to 18 different families were reported as shown in fig. 2. Table 2 showed the detailed enumeration of collected medicinal plants. Plants mostly belong to Asteraceae and Piperaceae families. The plant part used as a remedy for skin diseases is leaves (62%) followed by roots (19%), flowers (18%), seeds (15%) and whole plant (8%) respectively. Decoction (23%) is the most frequently used method in the study area. Fig. 3 showed that most medicinal plants are unknown or herbs.

Different skin diseases were noticed in the study area. The most common skin problems which are treated with traditional remedies are itching (42%) followed by boils (42%), acne (10%), wounds (3%) and inflammation (3%). It has been noticed that most herbal treatments are made

up of a mixture of more than one plant species or portion of a plant, as well as other supplements.

**Table 2. Detail enumeration of documented medicinal plants related to skin diseases from the study area**

| <b>Used as remedy for acne disorder</b>                    |               |                           |                |                  |
|--|---------------|---------------------------|----------------|------------------|
| <b>Vernacular Name/ Scientific Name</b>                    | <b>Family</b> | <b>Application Method</b> | <b>Disease</b> | <b>Part Used</b> |
| Aloe vera/ <i>Aloe barbadensis</i> mill.                   | Asphodelaceae | Ointment                  | Acne           | Whole            |
| Barberries/ <i>Berberis vulgaris</i> L.                    | Berberidaceae | Decoction                 | Acne           | Fruit            |
| Arq e Ghulab/ <i>Rosa indica</i> L.                        | Rosaceae      | Ointment                  | Acne           | Flower           |
| <b>Used as remedy for boil disorder</b>                    |               |                           |                |                  |
| Kameela/ <i>Mallotus philippensis</i> (Lam.) Müll. Arg.    | Euphorbiaceae | Ointment                  | Boil           | Flower           |
| Satynasi booti/ <i>Argemone Mexicana</i> L.                | Papaveraceae  | Ointment                  | Boil           | Leave, Root      |
| Panwar/ <i>Senna alexandrina</i> Mill.                     | Fabaceae      | Decoction                 | Boil           | Seed             |
| Charaita/ <i>Swertia chirayita</i> H. Karst.               | Gentians      | Decoction                 | Boil           | Whole            |
| Gule Mundi/ <i>Sphaeranthus indicus</i> L.                 | Asteraceae    | Decoction                 | Boil           | Whole            |
| Shreen/ <i>Albizia lebbek</i> (L.) Benth.                  | Fabaceae      | Ointment                  | Boils          | Seeds            |
| Wild Mint/ <i>Mentha arvensis</i> L.                       | Lamiaceae     | Decoction                 | Boils          | Whole            |
| <b>Used as remedy for inflammation disorder</b>            |               |                           |                |                  |
| Turmeric/ <i>Curcuma longa</i> L.                          | Zingiberaceae | Paste                     | Inflammation   | Roots            |
| <b>Used as remedy for itching disorder</b>                 |               |                           |                |                  |
| Kali Zeeri/ <i>Centratherum anthelminticum</i> (L.) Gamble | Asteraceae    | Decoction, Ointment       | Itching        | Seed             |
| Kali Mirch/ <i>Piper nigrum</i> L.                         | Piperaceae    | Decoction, Ointment       | Itching        | Seed             |
| Bapchi/ <i>Psoralea corylifolia</i> L.                     | Fabaceae      | Decoction                 | Itching        | Whole            |
| Neem/ <i>Azadirachta indica</i> A. Juss.                   | Meliaceae     | Ointment                  | Itching        | Leave            |
| Sandal Surkh/ <i>Santalum paniculatum</i> Hook. & Arn.     | Santalaceae   | Decoction                 | Itching        | Bark             |
| Anab/ <i>Ziziphus jujuba</i> Mill.                         | Rhamnaceae    | Decoction                 | Itching        | Fruit            |
| Kalwanji/ <i>Nigella sativa</i> L.                         | Ranunculaceae | Decoction                 | Itching        | Seeds            |
| Hena/ <i>Lawsonia inermis</i> L.                           | Lythraceae    | Paste                     | Itching        | Seeds            |

|  |          |          |         |                  |
|--|----------|----------|---------|------------------|
| Sheesham/ <i>Dalbergia sissoo</i> Roxb.<br>Ex. DC. | Fabaceae | Ointment | Itching | Leaves,<br>Seeds |
|--|----------|----------|---------|------------------|

**Used as remedy for wound disorder**

|                                  |            |          |       |       |
|----------------------------------|------------|----------|-------|-------|
| Arnica/ <i>Arnica montana</i> L. | Asteraceae | Ointment | Wound | Whole |
|----------------------------------|------------|----------|-------|-------|

UNDER PEER REVIEW

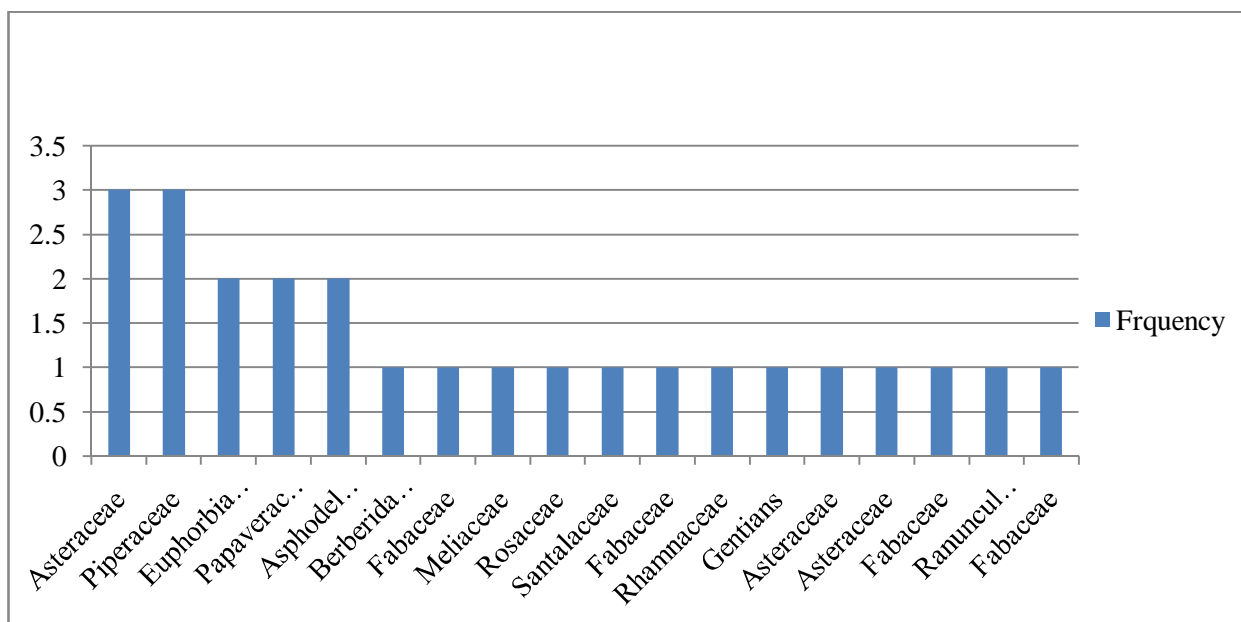


Figure 2. Family wise classification

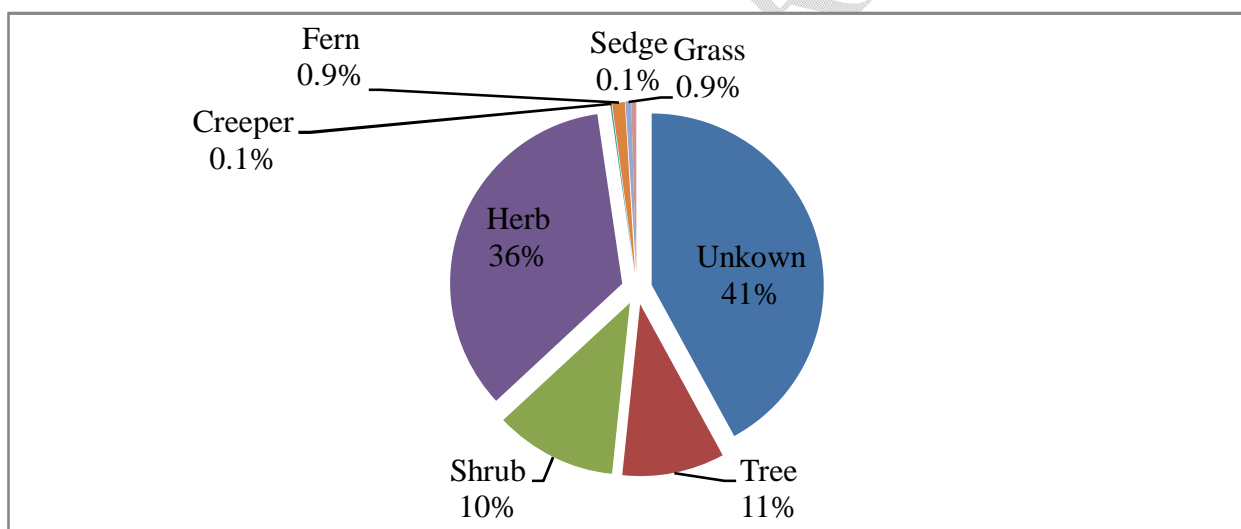


Figure 3. Life form of medicinal plants collected from the study area

### 3.3. Ethnobotanical indices data

According to fig. 5, the RFC values of several species ranged from 0.1 to 0.24, with *Aloe barbadensis* having the highest RFC value. Fig. 4 demonstrated that the FC value ranged from 20 to 60, with *Aloe barbadensis* once more having the highest value. As seen in fig. 6, FL ranged from 66 to 100%. The FL value of 15 medicinal plants is higher than 85%. The skin infections were divided into four groups according to commonly used classifications of skin problems. The skin disorders include itching, pimples, mumps, measles, wounds, boils, skin consumption,

abscesses, aggravation, skin disturbance, irritation, inflammation and acne. It is observed that most skin disorders were treated by using traditional remedies in which wild medicinal plants are used. Most local people visited traditional healthcare centers for the treatment of skin-related issues and belief in herbal medicines.

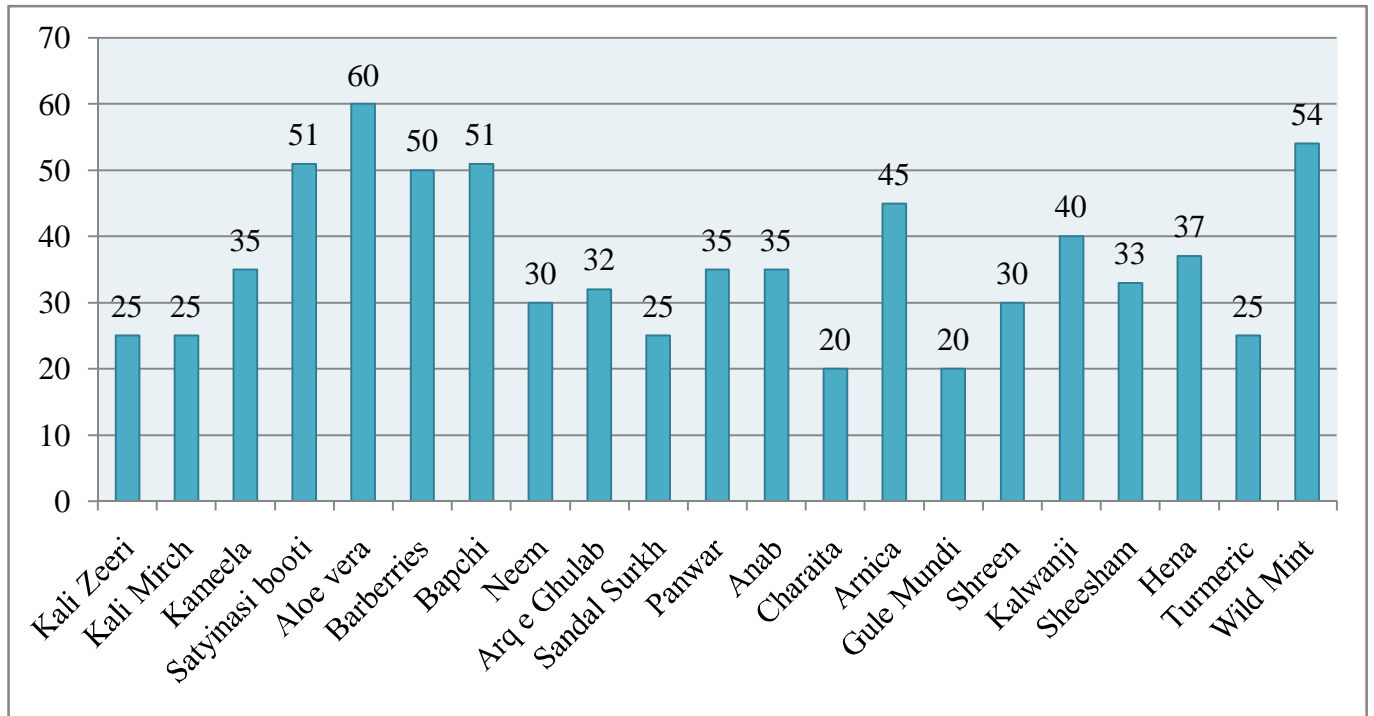


Figure 4. Frequency of citation of all collected medicinal plants from the study area

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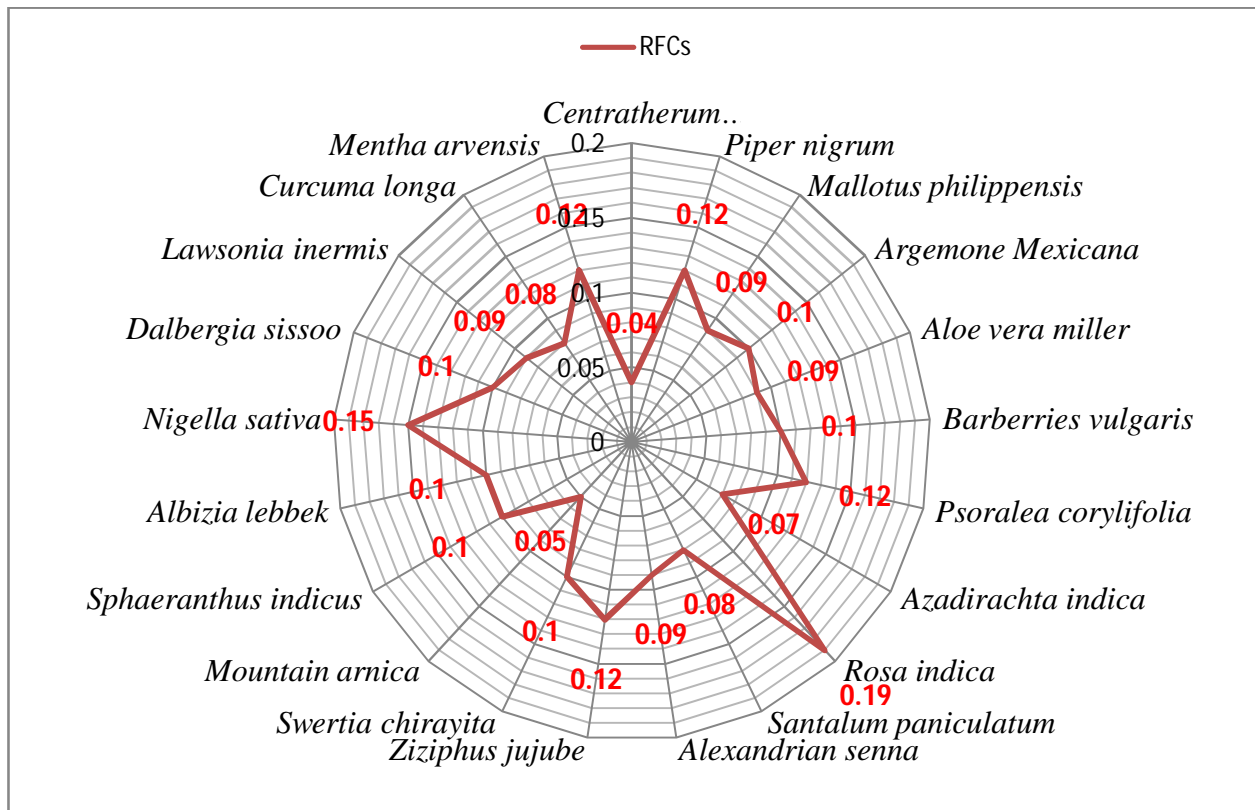


Figure 5. RFCs value of all documented medicinal plants

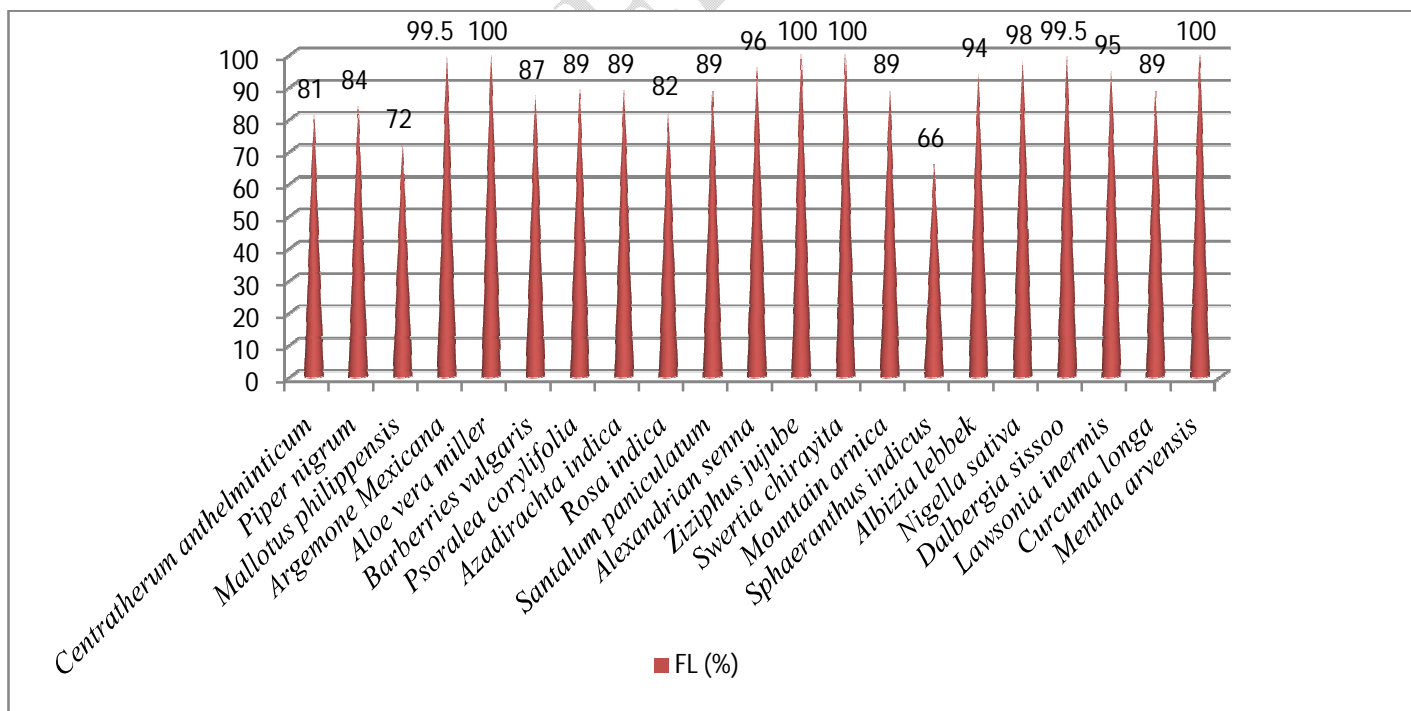


Figure 6. FL % of all documented medicinal plants

#### 4. DISCUSSION

Medicinal herbs and their extracts are natural treatments that have excellent potential for healing a wide range of ailments, including dermatological problems [31]. Medicinal plants have considerable therapeutic efficacy while having fewer negative effects. They offer a variety of uses in treating dermatological problems, whether as monotherapy or in combination with other treatments [32]. Herbal medication is traditionally used to cure different ailments including dermatological disorders is deeply ingrained in Pakistan. However, ethnobotanical investigations on the treatment of skin ailments in southern Punjab, Pakistan, remained spatially scattered. Herbal practitioners in the study region are well-versed in the use of therapeutic herbs, but many are hesitant to share their expertise with others. However, this vital information is in danger of being lost by the next generation. The purpose of this research study was to investigate the dermatological properties of medicinal plants used by different ethnic communities in southern Punjab, Pakistan and it seeks to establish a foundation for the development of novel medications with anti-skin activity.

It is observed that the skin disorders in the study area include itching, pimples, mumps, measles, wounds, boils, skin consumption, abscesses, aggravation, skin disturbance, irritation, inflammation and acne. It is also observed that local peoples were treated most skin disorders by using traditional remedies in which wild medicinal plants are used. Similar result was reported in the previous studies in Pakistan and neighboring countries [33, 34, 35, 36, 37]. Most local people visited traditional healthcare centers for the treatment of skin-related issues and belief in herbal medicine. The most common skin problems which are treated with traditional remedies are itching (42%) followed by boils (42%), acne (10%), wounds (3%) and inflammation (3%). It has been noticed that most herbal treatments are made up of a mixture of more than one plant species or portion of a plant, as well as other supplements.

Twenty-one (21) medicinal plants belonging to 18 different families were reported which are used for the treatment of skin disorders. Plants mostly belong to Asteraceae and Piperaceae families. The plant part used as a remedy for skin diseases is leaves (62%) followed by roots (19%), flowers (18%), seeds (15%) and whole plant (8%) respectively. These findings are consistent with most ethnobotanical research, which found that when plants are used to cure

various skin problems, the leaves are the preferred plant portion [10, 33, 16, 38, 39, 40]. During the survey, three different growth forms were recorded as dominating the research region, and it was determined that herbs dominate the area by contributing 35%, followed by shrubs (11%), and trees (10%). These findings agreed with those of [41, 42]. Herbs were widely used due to their abundance in the research region. A research study [33] was conducted ethnomedical research related to dermatology among indigenous communities of the tribal district of North Waziristan, Pakistan. In this study 77 plant species belonging to 49 families were reported to treat various skin disorders. It is also reported the leading life form was herbs and leaves were the most commonly used plant part used to treat skin diseases. Another study [34] Was carried out to document medicinal plants used in the treatment of skin disorders in Manoor valley, Pakistan. 48 Plant species used for treating skin problems was documented. It is also found that the dominating growth form was herbs. A research study conducted among herbal shops in Jahrom, Iran [35] also reported similar results. The usage of decoction is favored over other ways of use because it is simpler to prepare, requiring simply the combining of plant parts with water, tea, soup, or milk. It is also because heating plant materials in the form of a decoction accelerate the availability of active phytochemicals [43]. In Pakistan, the usage of plant components in the form of decoction is always favored, and this is confirmed by prior evidence [44, 45, 46].

To determine the popularity and efficacy of the reported plant species used to cure Skin illnesses, UV, RFC, FC, and FL were quantitatively measured. Numerous researchers used the aforementioned quantitative indices to assess the efficacy of the recorded plant species in their investigations [27, 28, 30]. RFC values ranged from 0.1 to 0.24, with *Aloe barbadensis* having the highest RFC value while the FC value ranged from 20 to 60. The highest value of FC was also recorded for *Aloe barbadensis*. It is important to examine ethnomedical species with high UVs and RFCs values to determine and show their pharmacological activity [47]. The fidelity level (FL) ranged from 66 to 100%. *Aloe barbadensis* has highest FL value (100%) as compared to other documented plant species. Another research study [33] also observed that *Aloe barbadensis* has high RFC, FC and FL values as compared to other documented plant species.

The documented 15 medicinal plants have a higher FL value than 85%. High FL demonstrates the particularity and extensive use of a plant species for a given ailment [48].

On the basis of the results of the study it is suggested that the reported medicinal plants which are used for the treatment of different skin diseases should be checked in the clinical trials and also phytochemical compounds should be quantified by using standard methods. Government authorities should take strict actions against those pansars whose sell the herbal products by mixing other materials. The study also emphasize that Government should also focused on the conservation of these wild local medicinal plant species.

## 5. CONCLUSIONS

21 medicinal plants were recorded to be utilized in the treatment of skin problems. Plants are largely members of the Asteraceae and Piperaceae families. Leaves (62%) are the plant portion most frequently used as a treatment for skin conditions, followed by roots (19%), flowers (18%), seeds (15%), and the entire plant (8%). The most frequently used medicinal plants in the form of decoction (23%). Relative Frequency Citation (RFC) values ranged from 0.1 to 0.24, with *Aloe barbadensis* miller having the highest RFC value while the frequency citation (FC) value ranged from 20 to 60. The highest value of FC was also recorded for *Aloe barbadensis*. The fidelity level (FL) ranged from 66 to 100%. The documented 15 medicinal plants have a higher FL value than 85%.

Consent:

After securing their informed prior consent only 120 traditional herbalists and pansar across the two main districts of southern Punjab were interviewed. The regional language was used to collect the data from the respondents.

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## Appendix

### Questionnaire sample

#### Section-I Respondent's Information

|    |                                       |  |
|----|---------------------------------------|--|
| Q1 | <b>Name:</b>                          |  |
| Q2 | <b>Age:</b>                           |  |
| Q3 | <b>Gender:</b> Male/Female            |  |
| Q3 | <b>District:</b> Multan/Vehari        |  |
| Q5 | <b>Education:</b> Literate/Illiterate |  |
| Q7 | <b>Income Source:</b> Hakeem/Pansar   |  |
| Q7 | <b>Locality:</b> urban/Pre-urban      |  |

#### Section-II Skin diseases Information

|     |   |  |
|-----|---|--|
| Q14 | <b>Skin diseases in the study area:</b>             |  |
| Q15 | <b>Dominant skin diseases in the study area:</b>    |  |
| Q16 | <b>Reasons of skin disorders in the study area:</b> |  |
| Q17 | <b>Availability of modern health facilities:</b>    |  |

|     |   |  |
|-----|---|--|
|     | Yes/No  |  |
| Q   | <b>People's belief in herbal medicines:</b><br>Yes/No                                     |  |
| Q18 | <b>Local peoples using herbal remedies for the treatment of skin disorders:</b><br>Yes/No |  |
| Q27 | <b>If yes, why:</b>   |  |
| Q   | <b>Medicinal plants used for the treatment of skin disorders in the study area:</b>       |  |
| Q29 | <b>Remarks (If Any):</b>  |  |

### Section-III Plant's Information

#### 1. Medicinal Plants used for the treatment of skin diseases

|     |   |  |
|-----|---|--|
| Q14 | <b>Local name:</b>  |  |
| Q15 | <b>Botanical Name:</b>  |  |
| Q16 | <b>Family Name:</b>   |  |
| Q17 | <b>Part used:</b> Root, stem, branches, leaves, fruit, seed, flowers, other                             |  |
| Q18 | <b>Application method:</b> Decoction, infusion, paste, powder, other                                    |  |
| Q27 | <b>Market Selling:</b> Yes, No  |  |
| Q27 | <b>Life form:</b> Herb, Shrub, Tree, Grass other  |  |
| Q   | <b>Used for skin diseases treatment:</b> Yes, No  |  |
| Q   | <b>Used for the treatment of skin diseases:</b>   |  |
| Q   | <b>Used for the treatment of any specific skin disorder mention name:</b>                               |  |
| Q   | <b>Used single herbal part or mixed different herbal parts or mixed other materials in combination:</b> |  |
| Q29 | <b>Remarks (If Any):</b>  |  |