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Indigenous uses, knowledge, and population density of threatened medicinal plants in Gabral valley, district Swat of-Pakistan

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Abstract
This study was focused with the aim to investigate and document the indigenous medicinal knowledge and common threats of medicinal plants from Gabral valley Swat Pakistan and to establish a baseline data in continuing studies aimed at more comprehensive investigations of indigenous medicinal plants. People of this area have strong belief in herbal medication by these medicinal plants. This investigation was carried out during 2014-15 to enlist plant species of this un-explored area and record their medicinal uses before the ethno-medicinal information is lost. Data were collected through the use of questionnaires and personal interviews during field trips. Total 19 plants species belonging to 18 families were identified by taxonomic description and locally by traditional knowledge of people in the area. This study was carried out to identify and protect these high value threatened medicinal plant species, indicating high potential for economic development through sustainable collection.

Keywords: Indigenous uses, threatened medicinal plants

1. Introduction
The information that is unique to a given culture or society which provide foundation for agriculture, health care, food research, education, environmental conservation and other life processes on native level is known as indigenous knowledge [1] Medicinal plants are playing important rule in human treatment and as well as in animals. Nowadays in allopathic and homeopathic methods of treatments the uses of medicinal plants are increasing so it is the cry of the day and need to conserve these threatened medicinal plant for future generations. Indigenous knowledge is as old as human civilization it is estimated that more than 80% of world population depend on traditional, mostly herbal, medicine to meet their primary healthcare requirements [2]. Total 4, 22,000 flowering plants have been reported from the world, out of them more than 50,000 are being used for medicinal purposes [3, 4]. Through oral discussion, contact, dealing and personal experience knowledge about indigenous plants has been moved from generation to generation [5]. Pakistan has a diverse climate and is pretty rich in medicinal plants dispersed over a large region of country. A total number of 1572 genera and 5521 species are identified but only 600 plant species are recognized and used for medicinal practices [6]. Some earlier researcher described that 275 locally used medicinal plants reported from the District of Swat [7]. Some reports have investigated 23 threatened plants from Buner, 87 from swat and 31 species from Chitral as well [8].

Present study was aimed to explore the most frequently used medicinal plants in Gabral valley district Swat Pakistan and to protect them. Therefore, a need was felt to document and conserve the traditional knowledge of the area, enlist plant species of the area, record and explore their herbal remedies before the information is lost forever.

2. Materials and Methods
Study area
The study was conducted in different area of Gabral valley such as 1) Kareen, 2) Gul Bandi, 3) Gul abad, 4) Ghowaye bela, 5) Dengue river, 6) Shahi bagh, 7) Bahan, 9) Kandool lake, 10) Dosan and 11) Laddo. Gabral is a beautiful valley of district Swat, it lies between 35° 20′ to 35° 48′ N latitudes and 72° 12′ and 72° 32′ E longitudes over an area of about 38733 hectares. The population of Gabral is 3238. The valley is surrounded by Chitral District in the north, Utror valley in the south and south west, upper Dir district in the west and Bhan and Mahodand valleys in the east. It is 20 km from Kalam [9].

Data collection

Regular field trips were arranged in different seasons of 2014-15. Information on the indigenous uses of plants were taken through formal and informal interviews and questionnaires from local people. In Gabral people mostly speak two languages Pushto and Gojri but some people rarely use Kohistani. Communication with the local community was carried out in these languages, led us to mix with the people of the area easily. Before going through formal and informal interviews for the medicinal plants with the local people, we took interest in their daily lives, social and religious activities because first intervention into the community was difficult. In this research study data (650 general information) were collected from 220 respondents of different age about these threatened medicinal plants from 11 villages (names of villages are given above in study area) (Table. 1). The interviews were based on informal talks with individuals and groups and 220 formal interviews including filling of both closed and open ended questionnaires was conducted. Information have been recorded about the indigenous uses, native names, part used and collection of plants (Table. 2). These collected plant samples were dried, presumed, mounted and have been recognized through accessible literature.

3. Results

The people of Gabral valley (Swat) depend on medicinal plants for treatment of diseases, and mostly these plants are used in form of powder, extracts and pastes. The rhizomes are being used frequently in crude natural herbal medicines. It has been reported that aged population have most of the indigenous knowledge of medicinal plants. About 19 species of medicinal plants belonging to 18 families have been documented through information (Table 2). Out of 19 plants of 18 families majority of the species 9 were herb (47.3%), followed by 8 shrubs (42.2%) and only 2 were tree (10.52%) (Fig. 1). Generally, the parts of the plant such as seeds, flowers, barks, stems, roots, fruits and leaves, have been consumed by traditional homeopaths. Nevertheless, it is dependent on the user requirement and type of plant. Herbs are being utilized as whole but on the other hand particular parts are used in case of shrubs and trees. Leaf of plants is the most commonly used portion in the preparation of medicinal medications. The collective utilization of leaf was observed (26.3%) followed by bark and whole plants (21%). Furthermore, rhizome and fruit (15.7%) seed and root tuber (10.5%) and pod, gum and dry fruit were recorded to be (5.2%) indicated that these plants portions have robust medicinal assets in preparation of remedies (Fig. 2).

In this research study a total number of 650 general information (data) were collected about these threatened medicinal plants from 220 respondents of 11 villages. Data analysis indicates that aged population of this area have more knowledge followed by middle and young population. On the basis of total collected information 409 (63%) plant information have been obtained from aged people (80 respondents), 169 (26%) plant information received from middle age (100 respondents) and only 72 (11%) plants information documented from 40 respondents of young generation (Table. 1; Fig. 3).

Table 1: Average indigenous knowledge of the respondents

Population	Respondents	Plants information	Percentage
Aged (above 50 year)	80	409	63%
Middle age (30--49)	100	169	26%
Yong age below 29	40	72	11%
Total	220	650	100%

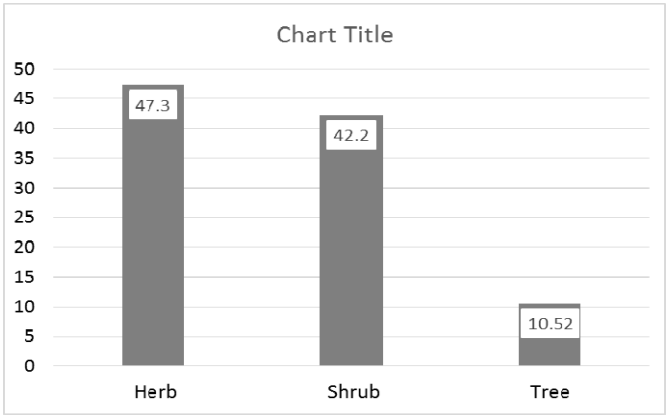

Fig 1: Indigenous knowledge based on (%) habit of the plants

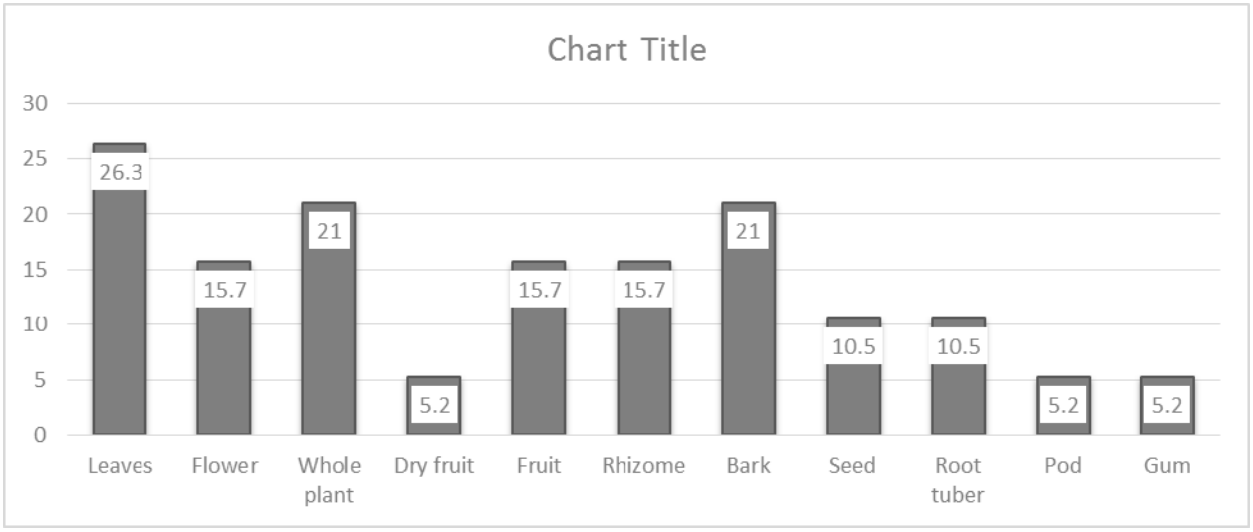

Fig 2: Indigenous knowledge based on percentage (%) of plant part uses

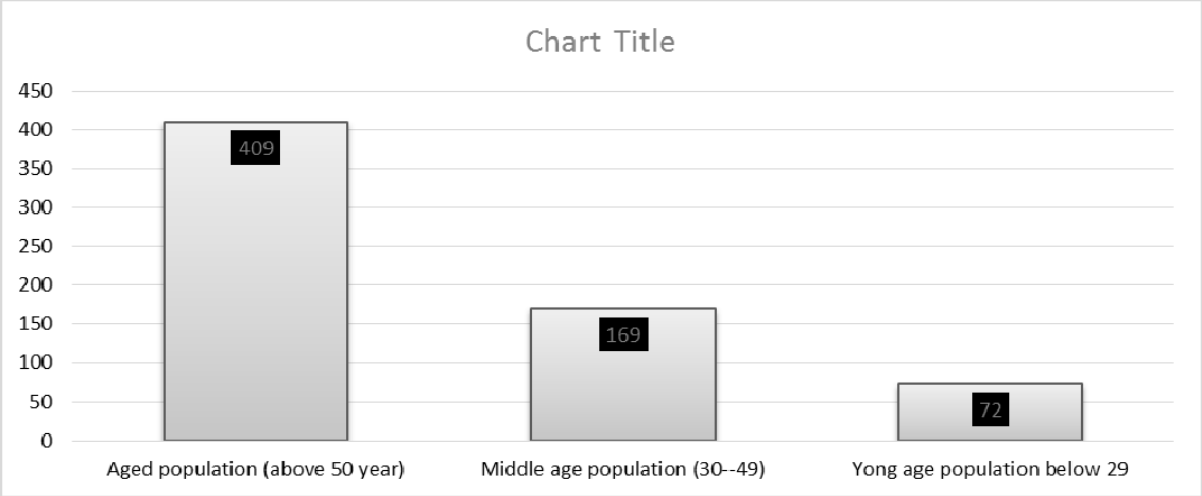

Fig 3: Plant information about Indigenous knowledge obtained from different age groups in the population.

4. Discussion

Pakistan is blessed with varied flora and climate. It has been reported that more than thousand plant species contain phytochemical properties while 355—405 species are treated in different local market by 30 manufacturing units of Geo-Arabic, Ayurvedic, and Homeopathic medicine. About 50,000 to 60,000 Tabibs (physicians of Geo-Arabic medicine) and large number of unregistered physicians scattered in rural and remote hilly area of Pakistan utilize more than 250 plants as house hold remedies for curing several diseases.

The people of Swat Gabral like most other indigenous people rely on plants resources for their medical requirements and in this way a traditional system of folk recipes evolved in this area. More than 155 plant species are used for curing different diseases in this area and more than 80% of the population is depending on these medicinal plants for their primary health care needs. Different parts of the plants are utilized for medicinal purposes. For instance, rhizome of *Berberis lyceum* is used for body and bone aches. This is also used for stomach and broken bones. The crushed powder of rhizome is mixed in local sweet dish called HALWA.

Many researchers have reported similar results for Buner (District name on the south of Swat) where plants have been collected by local community [10]. These plants are the rich source of treatment for different disease. Similar results have been reported on the use of plant as sources of traditional medicine [11-13]

Today, according to the World Health Organization (WHO), 80% of the world's population depend on traditional medicine for their primary healthcare needs. There are considerable economic benefits in the development of indigenous medicines and in the use of medicinal plants for the treatment of various diseases [14]. Due to the lack of modern communications, as well as poverty, ignorance and unavailability of modern health care facilities, most people especially in rural areas are still forced to practice traditional medicine for their common day ailments. Most of these people form the poorest link in the trade of medicinal plants [15]. A vast knowledge of how to use the plants against different illnesses may be expected to have accumulated in areas where the use of plants is still of great importance [16].

Table 2: The following 19 plant species were identified for their use in traditional healthcare system against diseases. The enumeration of plants contains botanical name, family name, local name, habit and uses.

Family	Botanical Name	Local Name	Habit	Part Use	Ethno-Medicinal Use
Acanthaceae	*Justicia adhatoda* Linn	Baikar	Shrub	Leaves, flowers	For cough, asthma, bronchitis and tuberculosis
Amaranthaceae	*Achyranthes aspera* Linn	Nary ghashkey	Herb	Whole plant	For fractured bones
Apiaceae	*Ammi visnaga (*L) Lam.	Spairkay	Herb	Dry fruit	Used in whooping cough and asthma
Arecaceae	*Phoenix dactylifera* Linn	Kajura	Tree	Fruit	For tonic, aphrodiasic, digestive and laxative
Asclepiadaceae	*Calotropis procera (*Willd	Aspalmay	Shrub	Whole plant	Plant used in asthma cholera, dental cleaning and earache
Berberidaceae	*Berberis lycium* Royle	kawary	Shrub	Rhizome	For backache, pharyngitis and intestinal colic wounds
Caesalpiniaceae	*Bauhinia variegata* Linn.	Kachnar	Tree	Bark, seeds	For scrofula, affected part of body
Liliaceae	*Asparagus plumosus* Linn	Tandoray	Herb	Root tubers	For diarrhea and dysentery
	Asparagus adscendens Linn	Shel-gwaty	Herb	Stem, leaf	Used to cure jaundice and congestive liver.
Mimosaceae	*Acacia nilotica* (L.) Delice.	Keekar	Shrub	Bark, pods	Bark used in diarrhea gum used in cough
Moraceae	*Broussonetia papyrifera* (L.) Ventenat	Jangly-tut	Tree	Bark, fruit	Laxative and febrifuge
Poaceae	*Cynodon dactylon* (L.) Pers.	Khabal	Herbs	Whole plant	Laxative, astringent, diuretic
Labiatae	*Mentha longifolia* (L.)Huds.	Jangly podeena	Shrub	Aerial parts	Carminative and stimulant
Cyperaceae	*Cyperus rotundis* L.	Dila-ghass	Herb	Tuber	Stimulant, astringent, diuretic and stomachic
Oxalidaceae	*Oxalis corniculata* L.	Khat buty	Herb	Whole plant	Antiscorbic, refrigerant, cooling and stomachic
Ranunculaceae	*Aconitum heterophyllum*	Serba zela	Herb	Rhizome	Use for fair color, gain of wait
Paeoniaceae	*Paeonia emodi*	Mameh	Herb	Root, seed	Blood purification, and gain of body weight
Cannabaceae	*Cannabis sativa Linn*	Bheng	Shrub	Leaves, flowers	The leaves are antispasmodic, and used in the form of bhang and charrs
Lythraceae	Woodfordia fruticosa (L) S. Kurz	Zangly anaar	Shrub	Flower and bark	To check bleeding from the nose which is locally called "nakseer or haspa"

5. Conclusion

Gabral valley has great diversity of medicinal plants and people are aware about their medicinal values. Many plants are playing vital role in the basic health care needs of study areas; such plants should be screened for detailed pharmacological studies to explore new biological and medicinal compounds.

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