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Ethno-veterinary practices used for treatment of various ailments in hilly areas of melagah valley district swat KPK, Pakistan

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Abstract
Ethno veterinary knowledge provides the folk medicines of livestock that are inexpensive than standard treatment and are easily accessible. In the current investigational research work from forty eight plants belonging to thirty families are described, these plants were used commonly as ethno medicine for treatment of various ailments in livestock. Dominated medicinal plants with most used values were *Aesculus indica* having values as (UVi= 0.792), *Ajuga bracteosa* Wall. Ex Benth (0.791), *Allium cepa* (0.788), *Allium sativum* (0.786), *Aloe vera* auct. Non Mill (0.7851), *Artemisia scoparia* (0.7842), *Berberis lyceum* Royle (0.7823). Based on the RFC values, the most cited medicinal plant species by the traditional drivers are *Aesculus indica* having (RFCs = 0.981), *Ajuga bracteosa* Wall. Ex Benth (0.9761), CI% results shown that most respondents percentage was for *Aesculus indica* (CI%= 79.321%), followed by *Ajuga bracteosa* Wall. Ex Benth (78.923%), The ethno medicinal plant species with highest fidelity level was of *Aesculus indica* cited 100% for Anti-helminthic, dry cough. Some other medicinal plant species with most fidelity level were *Ajuga bracteosa* Wall. Ex Benth (FL%= 97.91%), *Allium cepa* (92.34%), *Allium sativum* (87.13%), *Aloe vera* auct. Non Mill (84.661%) *Artemisia scoparia* (83.521) and *Berberis lyceum* Royle (80.697) etc, for various disorders, Informant consensus factor (FIC) ranged from 0.782 to 1, Different diseases viz. Anoxia, Anti-helminthic, Eye diseases, Flatulence and Stomachic, fracture pain, Pediculosis, Rheumatism and Vermifuge had maximum FIC value. It has been concluded that the People of study area deeply dependent on medicinal plants for the treatment of variety of livestock's ailments.

Keywords: Unexplored area (Melagah valley), traditional knowledge, Ethno veterinary practices, Livestock, Medicinal Plants

Introduction
Traditional veterinary medicine is very important in developing countries where conventional medicines for animal health maintenance are inaccessible or unaffordable to poor rural residents (McGaw *et al*., 2007) [24], nearly 80% of populations in the world today rely on folk (or traditional) medicine for treating both human and animal ailments (Iqbal *et al*., 2003). According to the United Nations Food and Agricultural Organization (FAO), the lack of drugs to treat diseases and infections results in losses of 30–35% in the breeding sector of many developing countries, where poor animal health remains the major constraint to increased production (FAO 2002) [11]. Problems of the service delivery to such groups are often worsened by a multitude of other factors (Muhammad *et al*., 2005) [17, 25], and these factors have helped to maintain traditional treatment practices in these countries and promoted research on this subject (Muhammad *et al*., 2005) [17, 25]. The extension of conventional veterinary services is particularly difficult and costly in developing world nations where the required infrastructure (roads, clinics, labs, cold chains, etc.) is poorly developed and where much of the public and its livestock reside in remote, rural areas or may be nomadic or transhumant (Mccorkle and Green, 1998) [21].
Medicinal plants are being used for the cure of several livestock diseases by the local inhabits since earliest times. It is a known fact that plants are a main source of ethno veterinary remedies (McCorkle, 1996) [23]. From the last years, ethno veterinary practices have gained incredible importance due to the discovery of some effective ethno veterinary products. EVP are more common in developing countries including Pakistan due to different socioeconomic factors (Wanzala *et al*., 2005) [40]. In agriculture sector of Pakistan livestock is very important and its population in Pakistan has increased up to 167.5 million heads, which is contributing 51.1% in an agriculture economy (Giday *et al*., 2003) [13]. Due to high dependence on agriculture and livestock, Pakistan is the world's 5th largest milk producing country (Akhtar *et al*., 2000) [4]. Approximately 53 million populaces of Pakistan living in rural areas and mostly derives their income from livestock through different methods (Ikram and Hussain, 1978) [15]. The limited resources available for feeding livestock, which ultimately leads to poor health livestock production resulting in economic losses while at present annual growth rate of meat and milk production in Pakistan is very slow due to poor forage quality, high incidence of diseases, poor prophylaxis, and high cost of modern veterinary drugs (Akhtar and Ahmad, 1992) [5].
It is assessed that 53 million people are supporting their livelihood through utilization of livestock (Sindhu *et al*., 2012) [34]. Due to the high price of modern medicines, the poor farmers are unable to pay the cost and they are attracted towards the traditional medicines. The farmers use the local plants and they consider EVM as the only cheap and easily available source for the solution of their problems (Sindhu *et al*., 2012) [34]. In Pakistan very little attention has been given on documentation of plants used as veterinary medicines and there is an immense need to document this knowledge (Shah *et al*., 2012) [31]. At present the valuable

traditional knowledge is disappearing rapidly. Moreover the escalating cost of allopathic medicines and the problem of environmental pollution, this is the time to develop cost-effective and environment friendly medicines for animal diseases. In the study area this is the first attempt to elucidate the ethno medicinal uses of plants as veterinary medicines. There is no proper documented form of such information and they are feared to become disappeared in recent past. Therefore, the endeavor before us is to revive the traditional technologies of livestock health care management by updating documents and validate the practices for the use of farmers and veterinarians (Shah *et al*., 2012) [31]. The main objective of the present research is the documentation of ethno-veterinary knowledge regarding various plant species used by the local inhabitants of the area for curing various animal diseases and ailments. It is presumed that the present research will be a base for further studies in ethno veterinary science, marketability and enterprises development of such valuable ethno veterinary medicinal plants.

Materials and Methods

Study area

The Melagah Valley (unexplored Valley) is located in the western part of district Swat adjacent to the border of district Dir lower. The Melagah Valley is located in the West of Swat at 34º47'36.46"N Latitude and 72°15'02.30"E Longitude at 3619 feet above sea level. The area is bordered by the high mountains, Swegalai in the West, Kabal in the east, Kotlai in the South and district Dir lower in North. (Fig.1). the community in the Melagah has multiple urgent needs resulting from economic poverty, geographical isolation and very poor provision of health, education and communication services. The research work cannot address all these issues but hopes to make a significant impact on a number of key signs for the health of the area's livestocks. Yakhtanagay, Qambo, Kasai, Shagai, Chinar, Landai Shah, Sarkhanai, Dokat and Kotlay upper are major villages of Melagah valley (Fig. 1). The Valley is full of natural resources and sceneries but many factors like no transportation, health care centers, markets, schools etc, as well as environmental factors are their due to which it didn't gain any importance yet. For data collection several visits were made on the basis of seasonal variation to different areas of Melagah.

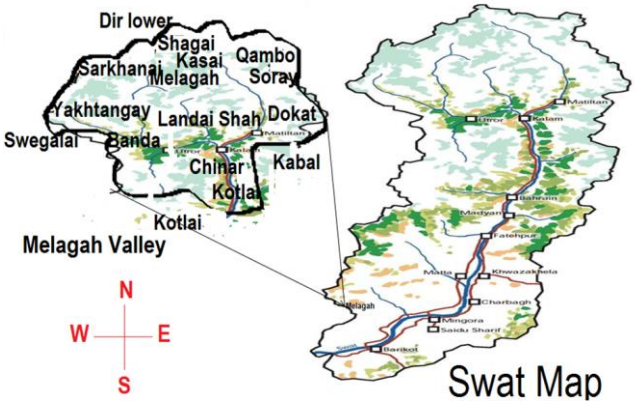

Fig 1: Map show the collection position of Melagah Valley district Swat

Medicinal plants collection, questionnaire and data collection

Two hundred local informants were interviewed. The study was conducted from March till November, 2017. The study was based on direct communication with the local informants of the area. A survey was developed to interview local people concerning the medicinal values of plants species. On the basis of this information, the medicinal value of study area plants was recoded and The collected from plants species and their genotypes were identify by Prof. Mehboob ur Rahman, plants specimen were deposited in the herbarium Department of Botany, Hazara University Mansehra, KP, Pakistan. The methodology was adopted by following the work of Qureshi *et al*., (2009) [2, 28]; Qureshi *et al*., (2008) [29] and Ahmad *et al*., (2009) [2]. The collected specimens were identified referring several Floras, viz., Flora of Pakistan, Hooker (1872 1897) [14]. The updated nomenclature of the identified species followed Siddiqui *et al*., (2007) [33] and Ahmed *et al*., (2009). Voucher specimens are deposited at HU. The data have been recorded through semi-structured interviews with populaces involved in the plants management (Alexiades, 1996) [6].

Statistical Analysis

Used value (UVi)

Used Value index evaluates the relative importance of each medicinal plant species based on their relative use among informants (Phillips *et al*., 1994) [27] and it was calculated by using the formula:

$$UVi = \sum Ui/N$$

Ui= each informant cited number of use reports for a given medicinal plant species where, Ni is the total number of informants interviewed for a given medicinal plant species.

Relative frequency of citations (RFCs)

To evaluate the traditional value and medicinal importance of each plant species in an area, the Relative Frequency of Citations formula was used (Tardio *et al*., 2008) [36].

$$RFCs = FCs/N$$

FCs = Number of local informants who reported traditional medicinal use of the species and N is the total number of informants of the study. (In this study, N = 200)

Consensus index (CI %)

Percentage of local informants having traditional knowledge of plant species medicinal use against diseases (In this ethno veterinary study) was calculated by Consensus index (CI%) which indicating citation by % of informants:

$$CI = n/N \times 100$$

Where, n is for the number of informants citing medicinal plant species, while N is the total number of respondents of the study.

Fidelity level (FL) value

The fidelity level (FL) is the percentage of indigenously informants claiming the given plant's use report for the

same major ailment. It was calculated by the following formula (Alexiades, 1996) [6]:

$$FL= Ip/Iu\times100$$

Ip = Use of plant species suggested by the number of informants for a particular disease and Iu is the total number of informants who cited same plant for any disease.

Informant consensus factor (FIC)

Informant consensus factor (FIC) value was used to analyze the consensus between use of plants for various ailment categories and respondents of the study area it was calculated by the following formula (Bhat *et al*., 2013) [7].

$$FIC= Nur- Nt/ Nur-1$$

Where, Nur = Number of use citations for a particular disease category while Nt is the number of botanical species used for a particular use category by all informants, the values of FIC range from 0 to 1. High value specifies that the informants are in favor on the use of plant species for a disease category and low value shows that plant species are randomly selected / informants do not exchange their traditional medicinal use knowledge.

Results

Demographic features

A total of 200 informants were interviewed of which 120 were males aged 25 to 80 years and 80 females 25 to 80 years. Traditional ethno medicinal drivers, shepherds, local informants were interviewed to seek wide range of information about the plants used for medicinal purposes.

Plant diversity

Ethnic diversity and rich flora are the key signs for the existence of rich traditional remedies (Yesilada, 2002). The current study described 48 plants belonging to 30 families commonly used to treat different livestock diseases by the local community. Only those plants were collected, for which the interviewers have solid opinion, valid and authentic information regarding their efficacy in traditional/ cultural ethno medicinal practices.

Table 1: List of Potential medicinal plants with scientific name, local name, parts used, and ailments collected from Melagha valley, KP, Pakistan.

S. No	Botanical Name	Family	Local Name	Habit	Part Used	Ethnobotanicinal Uses
1	*Aesculus indica* (Wall.ex Comb) Hook.*f.*	Hippocastanaceae	Kikar	Tree	Bark	colic and, chest. Anemia
2	*Ajuga bracteosa* Wall. Ex Benth.	Lamiaceae	Botee	Herb	Whole plant juice	Haemorrha-gic diseases , septicaemia
3	*Allium cepa*	Liliaceae	Piyaz	Herb	Leaves and bulb	For fever, Anoxia,Tick infestation, Gastrointestinal helminthiasis
4	*Allium sativum*	Liliaceae	Oga	Herb	Bulb	Anoxia,castells diseased, Tick infestation, Gastrointestinal helminthiasis
5	*Aloe vera* auct. Non Mill.	Liliaceae	Kamal Panhra	Herb	Leaves	abdominal pain,external wound healing
6	*Artemisia scoparia*	Asteraceae	Jawkay	Herb	Stem	For Stomach ache, antihelmenthic, used for healing of wounds.
7	*Berberis lyceum* Royle.	Berberidaceae	Toor kwaray	Shrub	Root,fruit	Myiasis, Root used for internal wounds,Mouth ulcers
8	*Bromus japonicus* Thurd. ex Murr.	Poaceae	Jokay	Herb	Shoot Power	Fodder treat constipation
9	*Avena sativa*	Poaceae	Jamdarai	Herb	Spikes,stem	Used for gastro problems
10	*Cannabis sativa* L.	Cannabinaceae	Bhang	Herb	Leaves	Pediculosis. tick infestation, Used for colic pain.for fever
11	*Capsicum annum* L.	Solonaceae	Marchakai	Herb	Fruit	digestion,used as an apetite causing agent.
12	*Cedrus deodara*	Pinaceae	Ranzra	Tree	Wood oil	flatulence and Stomachic
13	*Chenopodium murale*	Chenopodiaceae	Kharawa	Herb	Shoot & Root powder	plant is used for colic pain,for treatment of cough,anthalmentic
14	*Chenopodium ambrosioides* L.	Chenopodiaceae	Skha botay	Herb	Leaves	Used for piles.antihelmentic
15	*Carica papaya* L.	Caricaceae	Ghalaskay	Shrub	Leaves Dried leaves	anthalmentic,heal wounds
16	*Fumaria indica* (Hausskn.)Pugsl	Fumariaceae	Sam		Whole plant Decoction	Refrisent
17	*Foeniculum vulgare*	Lamiaceae	Kagay velaney	Herb	seeds,leaves	used is a Haemorhagic,Used for pneumonia, septicaemia
18	*Dodonea viscosa* (L.) Jacq.	Sapindaceae	Ghwaraskay	Shrub	Leaves, srem	Leaves used for healing of external burnt wounds.
19	*Daphne mucronata* Royle	Thymeleaceae	Laighonay	Herb	Whole plant powder	Anthalmentic
20	*Hyoscyamus niger* L.	Solanaceae	Bargak	Herb	Leaves decoction	use, internally, for wound Healing
21	*Mallotus philippensis* (Lam) Muell Ary	Euphorbiaceae	Kambela	Shrub	Fruit powder	vermifuge & diarrhea
22	*Mentha longifolia* (Linn) Huds.	Lamiaceae	Elanay	Herb	Leaves ,stem	decrease Inflammation & Relief flatulence
23	*Mentha arvensis* L.	Lamiaceae	Podina	Herb	Leaves	Give relief in gastric disorders, also used

						in colic pain.
24	*Melia azedarach* L.	Meliaceae	Tora Bekanrha,(shanday)	Tree	Seeds, stem, leaves	Antihelmentic,seed is used for infertility
25	*Micromeria biflora* Benth.	Lamiaceae	shamakay	Herb	Leaves	used for cough and fever
26	*Narcissus tazetta* L.	Amaryllidaceae	Gul nargis	Herb	Whole plant	Healing of external wounds
27	*Ocimum basilcum* L.	Lamiaceae	Kashmalay	Herb	Seed,leaves	Leaves extract used for digestive disorders.
28	*Olea ferruginea* Royle.	Oleaceae	Khona	Tree	Fruit,leaves,stem	Leaves used for mouth ulcers
29	*Origanum vulgare* L.	Lamiaceae	Shamakay	Herb	Leaves powder	increase lactation
30	*Oxalis corniculata* L.	Oxalidaceae	Manzakay tarookay	Herb	Leaves	Leaves used against worm
31	*Paeonia emodi* Wall.ex Royle.	Paeoniaceae	Mamekh	Herb	Rhizome powder	pain killer
32	*Primula denticulata* Smith.	Primulaceae	Mamera	Shrub	leaves Extraction	eyes disease
33	*Pronus armeniaca*	Rosaceae	Khobany	Tree	Fruit,stem,leaves	Fruit is used for constipation
34	*Punica granatum*	Punicaceae	ananghoray	Tree	Fruit,stem	Fruit is used in cough, fruit is also used for inflammation of urine.
35	*Quercus dilatata* Lindl. ex Royle	Fagaceae	Banj	Tree	Fruit power	urinary Problems
36	*Rumex dentatus* L.	Polygonaceae	Shalkhay	Herb	Leaves	constipation goats and sheeps
37	*Salvia moorcroftiana*	Rutaceae	Khardag	Tree	Leaves	Leaves are used for fracture pain.
38	*Sonchus oleraceus*	Asteraceae	Showdapai	Herb	Whole pant	Plant is used as a fodder also used for increasing milk production in cattles.
39	*Spinaceae oleraceae*	Brassicaeae	Palak	Herb	Whole plant	Leaves for increasing body meat and location
40	*Tribulus terrestris* L.	Zygophyllaceae	Markondai	Herb	Seeds,	Seeds are used in hemorrhoids.
41	*Verbascum Thapsus* L.	Scrophulariaceae	Khwarghwag	Herb	Whole plant	diarrhea & dysentery
42	*Teucrium stocksianum* Boiss	Lamiaceae	Spera botay	Herb	Leaves	Leaves used for mouth ulcers, sore throat.
43	*Desmostachya bipinnata* (L.) Stapf	Oleaceae	Dela	Herb	Bulb	Its bulbs are used in powdered form by for infertility,
44	*Plantago lanceolata* L.	Brassicaceae	Ghwai jabai	Herb	Whole plant	Used in saag,used as fodder, use for external wounds.
45	*Tamarix aphyla* (L) Karst.	Tamaricaceae	Ghaz	Tree	Whole plant	leaves used for infertility
46	*Cedrela serrata* Royle.	Asteraceae	Seta	Tree	Whole plant	Used for fever
47	*Zanthoxylum armatum* Dc.	Rutaceae	Dambara	Tree	Fruit, seeds & bark	anthalmentic and Carminative, promotelactation
48	*Zizyphus jujuba*.	Rhamnaceae	Markhanai	Tree	Fruit,leaves,stem	Leaves are used to promote lactation

Quantitative analysis

Used value (UVi)

The use values of medicinal plant species ranged from 0.122 to 0.792 (Table. 2). Dominated medicinal plants with most use values were Aesculus indica having (UVi= 0.792), Ajuga bracteosa Wall. Ex Benth (0.791), Allium cepa (0.788), Allium sativum (0.786), Aloe vera auct. Non Mill (0.7851), Artemisia scoparia (0.7842), Berberis lyceum Royle (0.7823), Bromus japonicus Thurd. ex Murr (0.7814), Avena sativa (0.771), *Cannabis sativa* L. (0.762), *Capsicum annum* L. (0.693), Cedrus deodara (0.674),Chenopodium murale (0.665), *Chenopodium ambrosioides* L. (0.663), *Carica papaya* (L.) Jacq. (0.641), Fumaria indica (Hausskn.)Pugsl (0.632), Foeniculum vulgare (0.621), *Dodonea viscosa* (L.) Jacq (0.641), Daphne mucronata Royle (0.491), Hyoscyamus *niger* L. (0.672), Mallotus philippensis (Lam) Muell Ary (0.491), Mentha longifolia (Linn) Huds (0.472), *Mentha arvensis* L. (0.464), *Melia azedarach* L. (0.4531), Micromeria biflora Benth. (0.442), Narcissus tazetta L. (0.432), *Ocimum basilicum* L. (0.4214), Olea ferruginea Royle. (0.4214), *Origanum vulgare* L. (0.4113), Oxalis corniculata L. (0.4102), Paeonia emodi Wall.ex Royle. (0.400), Primula denticulata Smith. (0.481), Pronus armeniaca (0.471), *Punica protopunica* (0.3731), Quercus dilatata Lindl. ex Royle (0.362), *Rumex dentatus* L. (0.354), Salvia moorcroftiana (0.342), Sonchus oleraceus (0.291), Spinaceae oleraceae (0.2621), *Tribulus terrestris* L. (0.253), *Verbascum Thapsus* L. (0.231), Teucrium stocksianum Boiss (0.221), *Desmostachya bipinnata* (L.) Stapf (0.191) while minimum used values of collected medicinal plants were *Plantago lanceolata* L (0.187). *Tamarix aphyla* (L) Karst (0.141), Cedrela serrata Royle, (0.141), Zanthoxylum armatum Dc. (0.141) and Zizyphus jujuba Gaertn (0.122). Maximum used values of cited medicinal plant species might be due to their extensive distribution and cultural driver's awareness which result those botanical species as the first choice for treatment (Ullah *et al*., 2014) [38]. Table 2 designates all the plants recorded with their respective scientific, local and family names, habit, parts used and particular diseases to prepare the phyto-medicines. Those plants reported by the interviewees were directed for all the local populaces of the research area.

Relative frequency citations (RFCs)

A relative frequency citation is calculated in order to know the most frequently used medicinal plants for various disorders. In the present analysis, it ranged from 0.121 to 0.981 (Table 2). Based on the RFC values, the most cited medicinal plant species by the traditional drivers are

Aesculus indica having (RFCs = 0.981), Ajuga bracteosa Wall. Ex Benth (0.9761), Allium cepa (0.951), Allium sativum (0.942), Aloe vera auct. Non Mill (0.931), Artemisia scoparia (0.921), Berberis lyceum Royle (0.915), Bromus japonicus Thurd. ex Murr (0.901), Avena sativa (0.901), *Cannabis sativa* L. (0.781), *Capsicum annum* L. (0.773), Cedrus deodara (0.751),Chenopodium murale (0.732), *Chenopodium ambrosioides* L. (0.661), *Carica papaya* (L.) Jacq. (0.660), Fumaria indica (Hausskn.)Pugsl (0.642), Foeniculum vulgare (0.631), Dodonea viscosa (L.) Jacq (0.651), Daphne mucronata Royle (0.600), *Hyoscyamus niger* L. (0.611), Mallotus philippensis (Lam) Muell Ary (0.574), Mentha longifolia (Linn) Huds (0.553), *Mentha arvensis* L. (0.549), *Melia azedarach* L. (0.534), Micromeria biflora Benth. (0.528), Narcissus tazetta L. (0.517), *Ocimum basilcum* L. (0.510), Olea ferruginea Royle. (0.484), Origanum vulgare L. (0.462), Oxalis corniculata L. (0.451), Paeonia emodi Wall.ex Royle. (0.442), Primula denticulata Smith. (0.391), Pronus armeniaca (0.361), *Punica protopunica* L. (0.352), Quercus dilatata Lindl. ex Royle (0.341), *Rumex dentatus* L. (0.332), Salvia moorcroftiana (0.321), Sonchus oleraceus (0.293), Spinaceae oleraceae and *Tribulus terrestris* L. (0.243 each), *Verbascum Thapsus* L. (0.234), Teucrium stocksianum Boiss (0.243), *Desmostachya bipinnata* (L.) Stapf (0.143 each) while minimum used values of collected medicinal plants were *Plantago lanceolata* L and *Tamarix aphyla* (L) Karst (0.143 each), Cedrela serrata Royle. and Zanthoxylum armatum Dc. (0.142) and Zizyphus jujube Mill. (0.121). Maximum used values of cited medicinal plant species might be due to their extensive distribution and cultural drivers awareness which resulted those botanical species as the first choice for treatment (Ullah *et al*., 2014) [38]. Table 2 designates all the plants recorded with their respective scientific, local and family names, habit, parts used and particular diseases to prepare the phyto-medicines. Those plants reported by the interviewees were directed for all the local populaces of the research area Maximum relative frequency citations clarify the facts that these medicinal plant species are very well known among the most number of traditional drivers (Bhat *et al*., 2013) [7]. Those medicinal plant species having maximum RFC should be further evaluated phyto-chemically and pharmaceutically to identify their active constituents for drug discovery (Vitalini *et al*., 2013) [39].

Fidelity level (%)

Fidelity level (FL %) is used to identify species that are most preferred by the inhabitants for the treatment of certain ailments. In the current study, fidelity level ranges from 16.786% to 100% (Fig. 4). The medicinal plant species with highest fidelity level was of Aesculus indica cited 100% for Anti-helminthic, dry cough. Some other medicinal plant species with most fidelity level were Ajuga bracteosa Wall. Ex Benth (FL%= 97.91%), Allium cepa (92.34%), Allium sativum (87.13%), Aloe vera auct. Non Mill (84.661%), Artemisia scoparia (83.521) and Berberis lyceum Royle (80.697) etc for various disorders as mentioned in (Table. 1). These mentioned plant species may be confirmed as important medicinal plants through further assessment and evaluation through phytochemical, biological and pharmaceutical activities. Many researchers obtained maximum fidelity level values against certain diseases like gastro intestinal problems (Lulekal *et al*., 1013) [19]. However the lowest fidelity level among these medicinal plants was of Zizyphus sativa Gaertn (16.786%). Moreover, plants with minimum FL should not be abandoned as declining to remark them to the future generation that it could raise the threat of gradual depletion of the cultural knowledge (Chaudhary *et al*., 2006) [9].

Consensus index (CI %)

Percentage of respondents questioned with traditional medicinal knowledge about plant species used to treat disorders and Consensus index (CI) of the botanical taxa are mentioned in Table 2, which ranged from 17.411% to 79.321% (Table 2). CI results revealed that most respondents percentage was for Aesculus indica (CI%= 79.321%), followed by Ajuga bracteosa Wall. Ex Benth (78.923%). Most consensus index for Berberis lycium was also reported by Khan and Ahmad, (2015). However, Allium cepa (77.421%) was followed by Allium sativum (76.392%), Aloe vera auct. Non Mill (76.392), Artemisia scoparia (74.341% each), Berberis lyceum Royle. (72.931%), Bromus japonicus Thurd. ex Murr. (70.102%). Avena sativa (70.02%), *Cannabis sativa* L (69.212%), *Capsicum annum* L. (68.456), Cedrus deodara (67.213), Chenopodium murale (65.432), *Chenopodium ambrosioides* L. (63.921), *Carica papaya* (L.) Jacq. (62.213), Fumaria indica (Hausskn.)Pugsl (60.928), Foeniculum vulgare (59.429), Dodonea viscosa (L.) Jacq. (58.143), Daphne mucronata Royle (56.241), Hyoscyamus niger L. (55.421%), Mallotus philippensis (Lam) Muell Ary (53.216), Mentha longifolia (Linn) Huds. (52.912%), *Mentha arvensis* L. (50.021), *Melia azedarach* L. (48.213), Micromeria biflora Benth. (47.429), Narcissus tazetta L. (45.621), *Ocimum basilcum* L. (44.112), Olea ferruginea Royle. (43.562), Origanum vulgare L. (40.421), Oxalis corniculata L. (39.422), Paeonia emodi Wall.ex Royle. (38.114), Primula denticulata Smith. (37.241), Pronus armeniaca (36.114), *Punica protopunica* L. (34.121), Quercus dilatata Lindl. ex Royle (33.219), *Rumex dentatus* L. (30.621), Salvia moorcroftiana (30.211), Sonchus oleraceus (29.216), Spinaceae oleraceae (28.421), *Tribulus terrestris* L (26.321) *Verbascum Thapsus* L. (24.021), Teucrium stocksianum Boiss (23.121), *Desmostachya bipinnata* (L.) Stapf (21.324), *Plantago lanceolata* L (21.181), *Tamarix aphyla* (L) Karst (20.363), Cedrela serrata Royle (19.122), Zanthoxylum armatum Dc. (18.217) and Zizyphus jujuba Gaertn (17.411). CI indicates consensus on the importance of Berberis lycium as important, well known medicinal plants used in cultural folk medicines and treat a number of disorders in the Swat valley. Dissimilar results were found by Khan and Ahmad (2015) [3] who reported that 'CI' values are highest for Berberis lycium.

Informant consensus factor (FIC)

Informant consensus factor (FIC) ranged from 0.782 to 1 (Table. 3) and their use reports (URs) from 28 to 200. Different diseases viz. Anemia, Anti-helminthic, Eye diseases, Flatulence and Stomachic, fracture pain, Pediculosis, Rheumatism and Vermifuge had maximum FIC value due to representation by only 1 medicinal plant taxa/ species (Nt = 1). Other most frequent and cited disease categories were Refrisent (FIC= 0.9921), followed by septicaemia (0.991), Pneumonia (0.9851), Skin disease (0.9830), Castells diseased (0.981), Tick infestation (0.979),

mouth ulcers (0.976), Appetite causing agent (0.968), Anti-helminthic (0.955), Hemorrhagic diseases (0.945), Dry Cough (0.941), Common fever (0.925) Diarrhea and Constipation (0.923) Digestive Problems (0.913 and Dysentery (914 each), Infertility (0.8881), External wound healing (0.8861), Urinary problems (0.886). Many disease categories having most citations or maximum number of species but their FIC values vary due to the basic indices of FIC formula as the consensus of informants on the use of medicinal plants against different disorders is described by the computed index FIC. Lowest FIC value was found in increase lactation (0.851).

Table 2: Medicinal plants with vernacular and family name, habit, part used, disease cured, UVi, RFCs, FL, CI

S. NO	Botanical Name	Local name	Part used	Uvi	RFCs	FL%	CI%
1	*Aesculus indica*	Jawaz	Fruit powder	0.792	0.981	100	79.321
2	*Ajuga bracteosa* Wall. Ex Benth.	Boteee	Whole plant juice	0.791	0.9761	97.91	78.923
3	*Allium cepa*	Piyaz	Leaves and bulb	0.788	0.951	92.34	77.421
4	*Allium sativum*	Oga	Bulb	0.786	0.942	87.13	76.392
5	*Aloe vera* auct. Non Mill.	Kamal Panhra	Leaves	0.7851	0.931	84.661	75.427
6	*Artemisia scoparia*	Jawkay	Stem	0.7842	0.921	83.521	74.341
7	*Berberis lyceum* Royle.	Toor kwaray	Root, fruit	0.7823	0.915	80.697	72.931
8	*Bromus japonicus* Thurd. ex Murr.	Jokay	Shoot Power	0.7814	0.901	79.221	70.102
9	*Avena sativa*	Jamdarai	Spikes, Stem	0.771	0.901	78.9231	70.02
10	*Cannabis sativa* L.	Bhang	Leaves	0.762	0.781	77.841	69.212
11	*Capsicum annum* L.	Marchakai	Fruit	0.693	0.773	68.921	68.456
12	*Cedrus deodara*	Ranzra	Wood oil	0.674	0.751	66.241	67.213
13	*Chenopodium murale*	Kharawa	Shoot & Root powder	0.665	0.732	65.647	65.432
14	*Chenopodium ambrosioides* L.	Skha botay	Leaves	0.663	0.661	64.734	63.921
15	*Carica papaya* (L.) Jacq.	Mamao	Dried leaves	0.641	0.660	63.652	62.213
16	*Fumaria indica* (Hausskn.) Pugsl Sam		Whole plant Decoction	0.632	0.651	62.781	60.928
17	*Foeniculum vulgare*	Kagay nalaney	seeds,leaves	0.621	0.642	60.143	59.429
18	*Dodonea viscosa* (L.) Jacq.	Ghwaraskay	Leaves, srem	0.604	0.631	58.671	58.143
19	*Daphne mucronata* Royle	Laighonay	Whole plant powder	0.491	0621	56.341	56.241
20	*Hyoscyamus niger* L.	Bargak	Leaves decoction	0.672	0.611	55.421	55.421
21	*Mallotus philippensis* (Lam) Muell Ary	Kambela	Fruit powder	0.491	0.600	51.678	53.216
22	*Mentha longifolia* (Linn) Huds.	Elanay	Leaves ,stem	0.472	0.574	49.912	52.912
23	*Mentha arvensis* L.	Podina	Leaves	0.464	0.553	47.341	50.021
24	*Melia azedarach* L.	Shanday	Seeds,stem,leaves	0.4531	0.549	46.341	48.213
25	*Micromeria biflora* Benth.	shamakay	Leaves	0.442	0.534	44.821	47.429
26	*Narcissus tazetta* L.	Gul nargis	Whole plant	0.432	0.528	42.931	45.621
27	*Ocimum basilcum* L.	Kashmalay	Seed,leaves	0.4214	0.517	41.321	44.112
28	*Olea ferruginea* Royle.	Khona	Fruit,leaves,stem	0.4214	0.510	38.113	43.562
29	*Origanum vulgare* L.	Shamakai	Leaves powder	0.4113	0.484	37.412	40.421
30	*Oxalis corniculata* L.	Manzakay tarookay	Leaves	0.4102	0.462	36.021	39.422
31	*Paeonia emodi* Wall.ex Royle.	Mamekh	Rhizome powder	0.400	0.451	34.441	38.114
32	*Primula denticulata* Smith.	Mamera	leaves Extraction	0.391	0.442	32.241	37.241
33	*Pronus armeniaca*	Khobany	Fruit,stem,leaves	0.384	0.391	31.961	36.114
34	*Punica protopunica* L.	ananghoray	Fruit,stem	0.3731	0.372	30.211	34.121
35	*Quercus dilatata* Lindl. ex Royle	Banj	Fruit power	0.362	0.361	29.712	33.219
36	*Rumex dentatus* L.	Shalkhay	Leaves	0.354	0.352	28.341	30.621
37	*Salvia moorcroftiana*	Khardag	Leaves	0.342	0.341	26.342	30.211
38	*Sonchus oleraceus*	Showdapai	Whole pant	0.291	0.332	24.34	29.216
39	*Spinaceae oleraceae*	Palak	Whole plant	0.2621	0.321	24.00	28.421
40	*Tribulus terrestris* L.	Markondai	Seeds,	0.253	0.293	24.00	26.321
41	*Verbascum Thapsus* L.	Khwarghwag	Whole plant	0.231	0.243	23.918	24.021
42	*Teucrium stocksianum* Boiss	Spera botay	Leaves	0.221	0.243	21.143	23.121
43	*Desmostachya bipinnata* (L.) Stapf	Dela	Leaves	0.191	0.334	20.021	21.324
44	*Plantago lanceolata* L.	Ghwai jabai	Whole plant	0.187	0.143	19.121	21.181
45	*Tamarix aphyla* (L) Karst.	Ghaz	Whole plant	0.187	0.143	18.113	20.363
46	*Cedrela serrata* Royle . seta		Whole plant	0.141	0.142	18.002	19.122
47	*Zanthoxylum armatum* Dc.	Dambara	Fruit, seeds & bark	0.141	0.142	17.896	18.217
48	*Zizyphus jujube* Gaertn.	Markhanai	Fruit,leaves,stem	0.122	0.121	16.786	17.411

Table 3: Groups of disorders and informant consensus factor (ICF) for each grouping.

Disease categories	No. of Taxa (Nt) Used	Use Reports (Nur)	Fic
Anemia	1	180	1.00
Anti-helminthic	4	68	0.955
Appetite causing agent	3	65	0.968
castells diseased	2	55	0.981
Diarrhea and constipation	5	53	0.923
Digestive Problems	5	47	0.913

Dry Cough	3	52	0.941
Dysentery	4	36	0.914
External wound	6	45	0.886
eyes disease	1	64	1.00
Fever	4	41	0.925
Flatulence and Stomachic	1	62	1.00
fracture pain	1	45	1.00
Hemorrhagic diseases	3	38	0.945
Increase lactation	5	28	0.8512
Infertility	4	28	0.8881
mouth ulcers	2	43	0.976
Pediculosis	1	200	1.00
pneumonia,	3	135	0.985
Refrisent	2	130	0.9921
Rheumatism	1	125	1.00
Septicemia	2	124	0.991
Skin disease	3	120	0.983
Tick infestation	2	50	0.979
Urinary Problems	6	45	0.886
Vermifuge	1	30	1.00

Discussion

Mostly poor farmers using the plant species for treatment of livestock got this knowledge from their ancestors, with exception of few, who learned this from others or by hit and experimental method. The individuals who contributed in this study were small holders and could not afford modern treatments. Thus it was easy for them to get plants from local area and to treat their animals with domestic formulae. That is why, due to poor purchasing power of inhabitants it is thought that incorporation of scientifically validated ethno-veterinary practices in livestock farming system in rural areas may help in poverty alleviation and increasing the livestock production (Iqbal *et al*., 2005) [17, 25]. During the present study it has been observed that farmers prefer to collect the required plant directly from field, depending upon season and availability of plant. It has also been observed that some plants are very popular in particular areas e.g., medicinal plants with most use values were Aesculus indica having (UVi= 0.792), Ajuga bracteosa Wall. Ex Benth (0.791), Allium cepa (0.788), Allium sativum (0.786), Aloe vera auct. Non Mill (0.7851), Artemisia scoparia (0.7842), Berberis lyceum Royle (0.7823). Based on the RFC values, the most cited medicinal plant species by the traditional drivers are Aesculus indica having (RFCs = 0.981), Ajuga bracteosa Wall. Ex Benth (0.9761). CI% results revealed that most respondents percentage was for Aesculus indica (CI%= 79.321%), followed by Ajuga bracteosa Wall. Ex Benth (78.923%). The medicinal plant species with highest fidelity level was of Aesculus indica cited 100% for Anti-helminthic, dry cough. Some other medicinal plant species with most fidelity level were Ajuga bracteosa Wall. Ex Benth (FL%= 97.91%), Allium cepa (92.34%), Allium sativum (87.13%), Aloe vera auct. Non Mill (84.661%) Artemisia scoparia (83.521) and Berberis lyceum Royle (80.697) etc for various disorders. Informant consensus factor (FIC) ranged from 0.782 to 1; Different diseases viz. Anoxia, Anti-helminthic, Eye diseases, Flatulence and Stomachic, fracture pain, Pediculosis, Rheumatism and Vermifuge had maximum FIC value. Many researchers reported Anti-tumor, Pile, Rheumatism etc as the most cited disease categories (Abbasi *et al*., 2013: Rokaya *et al*., 2014; Tangjitman *et al*., 2015) [1, 30, 35] and gastritis (Dogan and Ugulu, 2013) [10]. As for as disease categories concerned, gastrointestinal disorders have been cited with highest FIC values in previously published study like D.I. Khan, Karak, Kohat, Lakki Marwat, Pakistan (Tariq *et al*., 2015) [37]. In Ethno Veterinary Medicine every part of the plant is used such as bark, roots, wood, leaves, stem, flowers, fruit, juice, resin, latex, grains, buds, bulbs and seeds (Nfi *et al*., 2005) [26]. The communities included in the present study were customarily rural in nature. Consequently, the farmers were quite rich in the knowledge for animal health and production. Use of different plants for management of ecto- and endo-parasites has been documented earlier in different parts of world (Ch *et al*., 2006) but in Pakistan only few reports are available on documentation of Ethno Veterinary Practices (Farooq *et al*., 2007) [12]. So the present research work was first of its manner in which Ethno Veterinary Practices for control of disorders in hilly areas of Melagah valley, Pakistan. The mode of preparation of EVM depends on active ingredient to be extracted, route of administration and the medical intent (prophylaxis or therapy) (McCorkle and Mathias-Mundy, 1992) [22]. Part of the plant to be used, depends vehicle depends upon availability of material at home, as farmers do not have to pay for it. Research needs to be conducted on proper standardization of doses and selection of vehicles to reduce the risk of drug toxicity to animals and development of resistance in pathogens. This will also help in reducing the cost of treatment in cases, where ingredients are purchased from market.

Conclusion

Ethno-veterinary study has made possible to investigate some active compounds from therapeutic plants, thus these motivating ethno medicinal investigation can be research provoking for upcoming. EVM is under severe risk of urbanization, expanding agricultural demands and acculturating trend of village inhabitant. Due to urbanization, the ethno-medicinal knowledge can be lost in future, so it is a dire need to collect and systematically document this precious and empirical indigenous knowledge and pay due consideration to protect and conserve wild medicinal plants. In present investigation forty eight plants belonging to thirty families are described; these plants were used commonly as ethno medicine for treatment various ailments in livestock. Dominated medicinal plants with most use values were Aesculus indica having (UVi= 0.792),

Ajuga bracteosa Wall. Ex Benth (0.791), Allium cepa (0.788), Allium sativum (0.786), Aloe vera auct. Non Mill (0.7851), Artemisia scoparia (0.7842), Berberis lyceum Royle (0.7823).). Based on the RFC values, the most cited medicinal plant species by the traditional drivers are Aesculus indica having (RFCs = 0.981), Ajuga bracteosa Wall. Ex Benth (0.9761). CI% results revealed that most respondents percentage was for Aesculus indica (CI%= 79.321%), followed by Ajuga bracteosa Wall. Ex Benth (78.923%). The medicinal plant species with highest fidelity level was of Aesculus indica cited 100% for Anti-helminthic, dry cough. Some other medicinal plant species with most fidelity level were Ajuga bracteosa Wall. Ex Benth (FL%= 97.91%), Allium cepa (92.34%), Allium sativum (87.13%), Aloe vera auct. Non Mill (84.661%) Artemisia scoparia (83.521) and Berberis lyceum Royle (80.697) etc, for various disorders. Informant consensus factor (FIC) ranged from 0.782 to 1; Different diseases viz. Anoxia, Anti-helminthic, Eye diseases, Flatulence and Stomachic, fracture pain, Pediculosis, Rheumatism and Vermifuge had maximum FIC value. Ethno-veterinary plants and medicines documented here need phytochemical and pharmacological screening for active principles and clinical trials for therapeutic actions. The use of herbal medicines in the research area could most likely be promoted and strengthened by initiating a coordinated programmer of research and development for evaluating and testing the efficacy of the plants in use by standardizing methods for cultivation and preservation of plants.

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Competing interests
The authors declare that they have no competing interests.

Authors' contributions
NM and NA conducted the field work, analyzed the data write paper. NU supervised all stages of the work presented in this report and provides comments on the report. All authors read and approved the final manuscript.

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