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SCREENING OF FOLK REMEDIES BY GENUS *ARTEMISIA* BASED ON ETHNOMEDICINAL SURVEYS AND TRADITIONAL KNOWLEDGE OF NATIVE COMMUNITIES OF PAKISTAN

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Abstract

Biodiversity provides a strong plant-human association, livelihood and self defence to poor villagers against many pathogens. In Pakistan and worldwide the indigenous communities used to get many benefits from biodiversity and its ethno medicinal products. They had preference of herbal remedy over modern drugs for the treatment of their sicknesses. The aromatic *Artemisia* has a central position in the family *Asteraceae* by virtue of its versatile diversity, distinguishing characteristics, socioeconomic and ecological impacts. It had been being widely used as food, forage, ornamental and therapeutically purposes. The article aimed to compile the best inventory of *Artemisia* based on historical impacts, folk remedies and indigenous knowledge of native communities of Pakistan. The study demonstrated that *Artemisia* had been proved better natural defence against 36 different ailments. The potential therapeutical responses against diseases were shown by *A. scoparia*, *A. kurramensis* and *A. brevifolia*. Due to effective uses as purgative, ENT problems and antivenin properties, *A. scoparia* had been considered as the best medicinal herb. *A. dubia* and *A. brevifolia* had been ranked as the best remedy of gastric problems. The study will help to locate the empty slots for new scientific researchers regarding the ethnomedicinal uses of *Artemisia*.

Introduction

Pakistan being blessed with rich plant biodiversity represents more than 6,000 flowering plant species (Shinwari, 1996). The plant species confined to hilly areas (Northern side) of Pakistan contributed main part of biodiversity and provided a strong association between plants and man. It had been providing livelihood to local inhabitants since the beginning of civilization by domesticating livestock, apiculture and sericulture. The poor communities were always indulging in collection, processing, usage and seal of Green Pharmaceuticals.

Rural people had critical knowledge about the importance of plants, its medicinal parts, processing and manufacturing for herbal medicines for cure of their diseases. They got desired parts of plants during vegetative or reproductive stages according to the recipes owned from their forefathers. Either these different parts had been eaten directly or had been taken with some other suitable supplements.

Not only in Pakistan but also worldwide the people of remote areas used to get self defence against many pathogens due to different organic and inorganic chemicals present in herbal biodiversity.

Shawi *et al.,* (2011) isolated a flavonid named "Eupatilin (5, 7-dihydroxy-3', 4', 6-trimethoxyflavone)" having anticancer and antioxidant properties to treat human melanoma (cell line A375). Antihelmintic agent "Santonin" had been isolated from *Artemisia maritima* (Khokhar *et al.*, 2010). Other chemicals found in *A. maritima* were Terpenes, Sesquiterpenes and Flavanoids (Avula *et al.,* 2009; Bilia *et al.,* 2006; Wu *et al.,* 2006; Carla *et al.,* 2006).

Artemisia represents the largest genus of family Asteraceae by contributing 200-500 representative species to tribe Anthemideae (Kubitzki, 2007; Ling *et al.*, 2006; Bremer & Humphries, 1993). The fossil records of *Artemisia* showed its origin from semi-arid Asia 20 M years ago in mid Cenozoic era (Wang, 2004). Hence Central Asia was considered the main hub of diversification of genus *Artemisia* from where its speciation occurred to rest of the world having wide range of environments (Pellicer *et al.,* 2011; Shultz, 2006; Valles & McArthur, 2001). Its members may be herbaceous or shrubby mostly having perennial habitat (Pellicer *et al.*, 2011, Ling *et al.,* 2006) whereas annuals or biannual species were limited in number (Valles *et al.,* 2003). Its common uses included food (culinary condiment) forage, ornamental (Pellicer *et al.*, 2011). The leaves had therapeutic properties by presenting *Artemisinin*, the best natural medicine to cure malaria and fever. *Artemisinin* obtained from *A. annua* have the anticancer properties to kill the cancer cells of human breast (Singh & Lai, 2001).

The main objectives of the articles were to compile the best inventory of traditional knowledge and therapeutic impacts of genus *Artemisia* on the indigenous communities residing in remote areas of Pakistan

Methodology: The experimental design followed by the workers for documentation of Traditional Knowledge of different native ethnic groups of Pakistan included following steps.

1. Preliminary field visits and surveys to get plant specimens from the selective study areas.
2. Photographs and voucher herbaria for correct scientific identification and nomenclature.
3. Questionnaire from older people, women and knowledgeable young people to get primary raw data (Local names, parts used, recipe).
4. Confirmation of the obtained indigenous information from local herbalists (Pansaries/saniasi/jogi) and herbal doctors (Hakeems).

5. Systematic tabulation and documentation of secondary data.
6. Submission of herbaria in relative funding department/ university.
7. Publication of the qualitative and qualitative data in a systematic way showing their taxonomy (Local name/English name, family) and their uses (Parts used and recipe)

Results and Discussions

In the present paper the genus *Artemisia* is treated in a broader sense including the genus *Seriphedium*. *Artemisia* biodiversity in Pakistan is presented by 38 species (25 species of *Artemisia* s. str. and 13 species of *Seriphedium* s. str.) mainly distributed in Kashmir, Khyber Pakhtoon Khawa, Northern Punjab and Baluchistan (Ashraf *et al.*, 2010; Ghafoor, 2002). There was an urgent need of systematic approach for the collection and cultivation of these medicinally important plants (Shinwari & Khan, 2000). Shinwari *et al.*, (2002) took first step to initiate the awareness about importance, conservation and sustainable use of this God gifted wealth of Pakistan. They made an inventory of the ethnomedicinal uses of biodiversity and wrote a famous book "Pictorial Guide of Medicinal Plants of Pakistan" (Shinwari *et al.*, 2006).

Many Pakistani scientists had documented this natural treasure of the country in number of national and international journals. They had demonstrated local names, flowering period, parts used, complete recipe and the sicknesses cured by these plants. But in the article only the folk remedies and diseases cured by different species of *Artemisia* had been compared and discussed, so that a complete inventory of ethnomedicinal use of Genus *Artemisia* can be made. For instance, Iqbal *et al*., (2004) studied the ethno-veterinary uses of *A. brevifolia* (locally known as "afsanteen") and considered it as antihelmintic herb in Pakistan. The market trade value of *Artemisia kurramensis* (syn. *Artemisia maritima* Hook. f. non L.) was also demonstrated by Zaidi (1996).

Pakistan had huge literature related to ethnobotany (indigenous information about herbal uses) of different remote areas and different ethnic groups. From the available material total 37 ethnomedicinal surveys were scrutinized and analysed to evaluate the ethnomedicinal impact of *Artemisia* on the social health care of indigenous communities of Pakistan (Table 1). These surveys had been carried out in different localities of Khyber Pakhtoon Khawa, Punjab , Azad Jamun and Kashmir, Northern Areas of Pakistan, Balochistan and three national park viz. Ayubia National Park (Ahmad & Javed, 2007), Chitral, (Ali & Qaiser, 2009) Chitral Gol National Park (Khan *et al*., 2011) and Margallah Hills National Park, Islamabad (Jabeen *et al*., 2009, Shinwari & Khan., 2000).

Table 1. The ethnomedicinal impact of genus *Artemisia* in Pakistan showing no. of reported studies and no. of diseases Cured by respective species.

Species name	No. of reports	No. of disease
A. absinthium	7	17
A. annua	2	8
A. brevifolia	8	12
A. dracunculus	1	1
A. dubia	5	13
A. oliveriana	1	3
A. japonica	4	4
A. macrocephala	1	2
A. kurramensis	9	28
A. moorcroftiana	1	1
A. roxburghiana	3	6
A. santolinifolia	2	3
A. scoparia	21	62
A. vulgaris	7	11

The results demonstrated that different scientists had evaluated the importance of different species of *Artemisia* giving accumulative score of 74 species (Table 1). Total 14 species were common including *A. absinthium, A. annua, A. brevifolia, A. dubia, A. dracunculus, A. maritima* Hook. f. non L., *A. japonica, A. Kurramensis, A. macrocephala, A. moorcroftiana, A. parviflora, A. roxburghiana, A. santolinifolia, A. scoparia* and *A. vulgaris.*

These plants were effectively used for the remedy of 36 different ailments (Tables 2 and 3) by using different parts such as root, stem, fruit and whole plant as a whole (Fig. 3). On the basis of frequency of ethnomedicinal surveys these species were classified into 3 groups viz., Climax, moderate and Smaller group (Figs. 1a, b and c). The potential therapeutrical responses and folk remedies by these groups had been illustrated in Fig. 2a and b.

A. scoparia had been considered the best antidote for snake and scorpion bites. *A. Kurramensis* was declared best as vermifuge while *A. brevifolia* was excessively used for gastric problems and vermifuge.

Table 2. The Ethnomedicinal surveys and number of *Artemisia* species reported from different areas of Pakistan

No.	Ethnobotanists	Locality	No. of species
1.	Afzal *et al.,* (2009)	Northern Pakistan	3
2.	Ahmad & Hussain (2008)	Salt Range (Kallar Kahar)	1
3.	Ahmad & Javed, (2007)	Ayubia National Park	1
4.	Ahmad *et al.,* (2006)	District Attock, Punjab	1
5.	Ahmad *et al.,* (2006b)	Booni Valley, District Chitral	2
6.	Akhtar & Begam, (2009)	Jalala, District Mardan, KPK	2
7.	Alam *et al.,* (2011)	Chagharzai valley, District Buner	2
8.	Arshad & Ahmad, (2005)	Galliyat Areas of KPK	2
9.	Asad *et al.,* (2011)	Different areas of Pakistan	1
10.	Ashraf *et al.,* (2010)	Northern Areas of Pakistan	8
11.	Awan *et al.,* (2011)	Kaghan Valley, District Mansehra KPK	1
12.	Barkatullah & Ibrar, (2011)	Malakand Pass Hills, District Malakand, KPK	1
13.	Barkatullah *et al*., (2009)	Charkotli Hills, Batkhela District, Malakand KPK	1
14.	Dar, (2003)	Lawat District Muzaffarabad AJK	1
15.	Hamayun *et al.,* (2006)	District Swat KPK	2
16.	Hayat *et al.,* (2008)	Tehsil Pindigheb, District Attock, Punjab	1
17.	Hayat *et al*., (2009)	Different areas of Pakistan	12
18.	Hussain *et al*., (2004)	Islamabad and Murree Region	1
19.	Hussain *et al*., (2010)	Jalalpur Jattan, District Gujrat, Punjab	1
20.	Ibrar *et al.,* (2007)	Ranyal Hills, District Shangla	2
21.	Jabeen *et al*., (2009)	Margallah Hills National Park, Islamabad	1
22.	Jan *et al.,* (2009a)	Dir Kohistan Valleys, KPK	1
23.	Jan *et al*., (2009b)	Dir Kohistan Valleys, KPK	4
24.	Jan *et al.,* (2010)	Dir Kohistan Valleys, KPK	1
25.	Khan *et al*., (2007)	High Altitudes of Pakistan	2
26.	Khan *et al.,* (2011)	Chitral Gol National Park (CGNP), KPK	3
27.	Mahmood *et al.,* (2011a)	District Bhimber, Azad Jammu and Kashmir	1
28.	Mahmood *et al.,* (2011b)	Barnala Area, District Bhimber, AJK	1
29.	Mahmood *et al.,* (2011c)	Neelum, Azad Jammu & Kashmir	1
30.	Mughal, (2008)	Southern Punjab	3
31.	Nisar *et al.,* (2011)	District Mandi Bahaudin, Punjab	1
32.	Sardar & Khan, (2009)	Tehsil Shakargarh, District Narowal, Punjab	1
33.	Shah & Khan, (2006)	Siran Valley Mansehra KPK	1
34.	Sher *et al.,* (2011)	Northern Parts of Pakistan	3
35.	Shinwari & Khan, (2000)	Margalla Hills National Park, Islamabad	1
36.	Shinwari *et al*., 2011	Kohat Pass KPK	1
37.	Tareen *et al*., (2010)	Kalat & Khuzdar Regions (Balochistan)	1
			74

Table 3. Ethnomedicinal uses of genus *Artemisia* based on Ethnobotanical surveys and traditional knowledge of native communities of Pakistan.

Plant name	Antidote	Burns	ENT	Fever	Gastric problems	Malaria	Purgative	Respiratory Disorders	Skin infections	Vermifuge	*Others	Total
A. absinthium	-	-	1	1	2	-	-	-	2	2	9	**17**
A. annua	-	-	-	2	1	1	-	-	-	-	4	**8**
A. brevifolia	-		1	-	4	-	1	1	-	3	2	**12**
A. dubia	-	-	-	1	**5**	-	-	-	2	3	2	**13**
A. dracunculus	-	-	-	-	-	-	-	-	-	-	1	**1**
A. oliveriana	-	-	-	-	-	-	-	-	-	-	3	**3**
A. japonica	-	-	-	-	-	4	-	-	1	-	-	**4**
A. kurramensis	-	-	1	1	1	**3**	-	**3**	**4**	**6**	9	**28**
A. macrocephala	-		-	-	-	-	-	1	-	-	1	**2**
A. moorcroftiana	-	-	-	-	-	1	-	-	-	-	-	**1**
A. roxburghiana	-	-	-	2	-	1	-	-	-	2	1	**6**
A. santolinifolia	-	-	-	-	1	-	-	-	-	2	-	**3**
A. scoparia	**8**	**7**	**10**	2	1	2	**11**	2	1	4	14	**62**
A. vulgaris	-	-	-	2	1	1	-	1	1	-	5	**11**
	8	**7**	**13**	**11**	**16**	**13**	**12**	**8**	**11**	**22**	**51**	**171**

***Others** = Anathematic, Anathematic, Anti-inflammatory, Antiseptic, Antispasmodic, Antidandruff, Blood Purifier, Cardiac Problems, Cold, Cooling Agent, Cough, Dental Problems, Diabetes, Diarrhea, Diuretic, Jaundice, Menstrual Disorders, Moxa, Neurological Disorder, Pain Killer, Renal Problems, Rheumatism, Tonic, Wounds

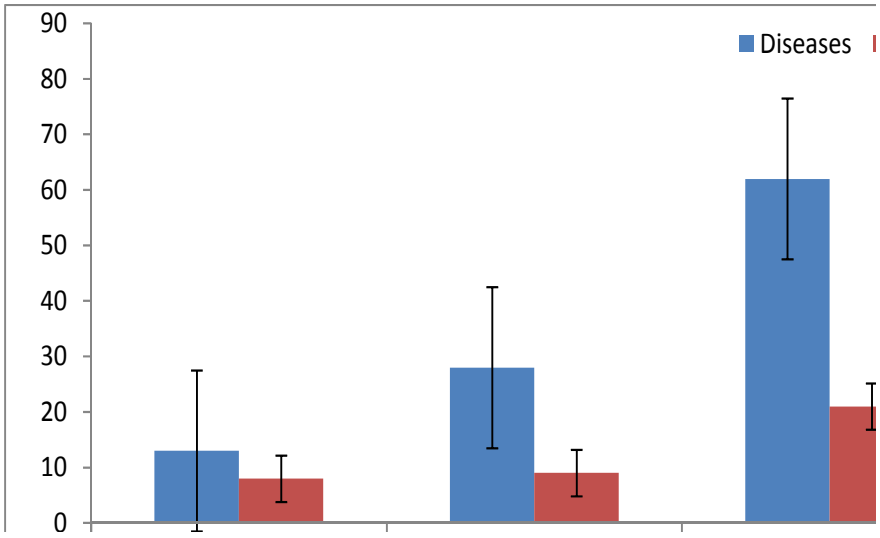

Fig. 1(a). Climax group of *Artemisia* having ethnomedicinal studies greater than seven.

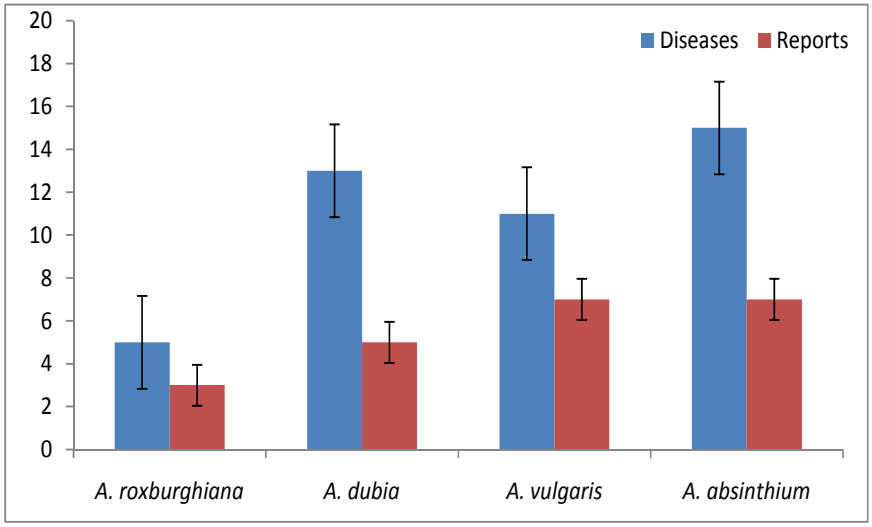

Fig. 1(b). Moderate group of *Artemisia* with ethnomedicinal studies in b/w three and seven.

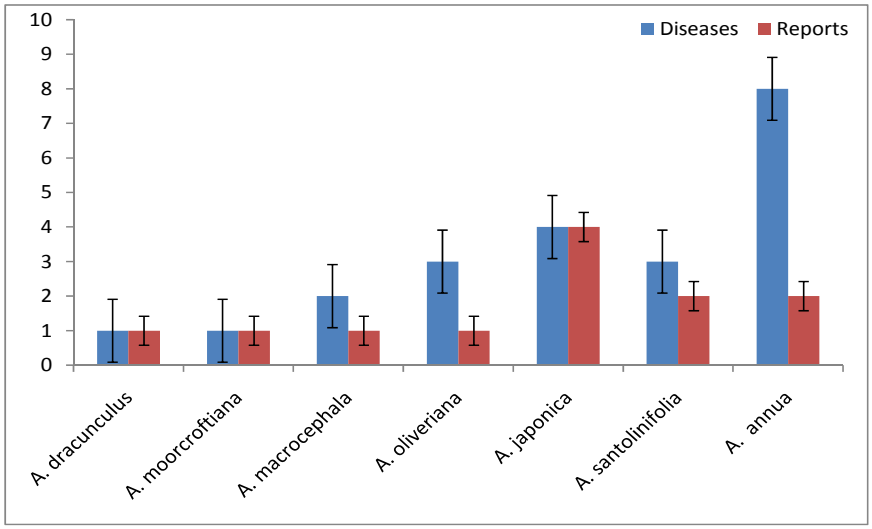

Fig. 1(c). Smaller group of Artemisia having Ethnomedicinal reports lesser than three.

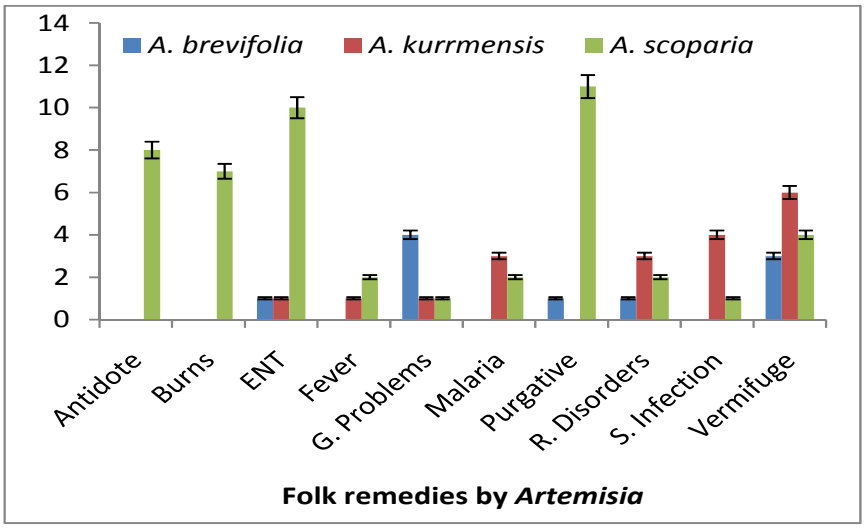

Fig. 2(a). The ailments treated by members of climax group.

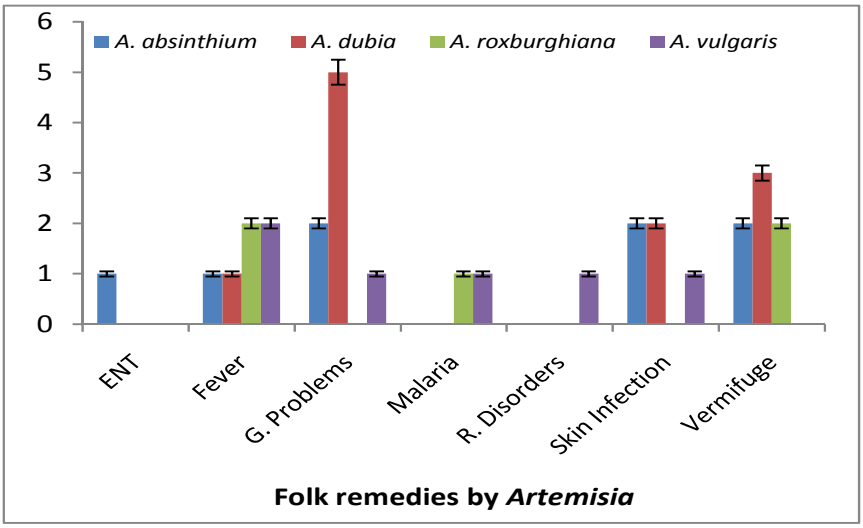

Fig. 2(b). The folk remedy of diseases by moderate group.

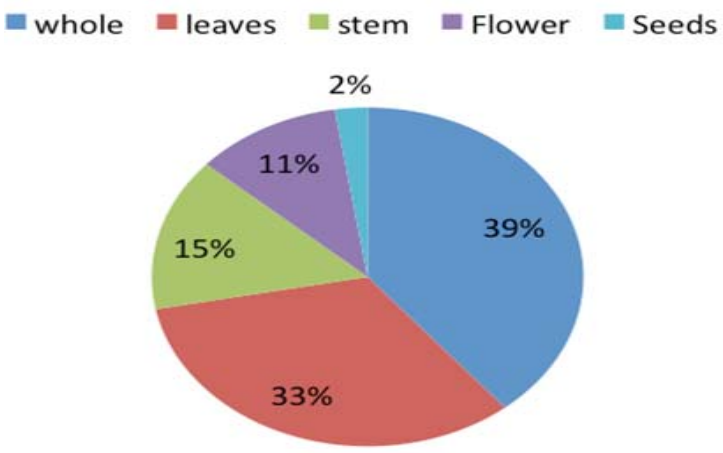

Fig. 3. Parts of *Artemisia* species used in folk remedies.

Conclusions

The study concluded that ethnomedicinal impacts of *Artemisia* in socio-economic life of Pakistani communities revolved around 17 main species. It did not mean that rest of the species have no effective uses for folk remedy. This indicated the gap to be filled by future workers. Also for the member of smaller group, there was need to collect more information from other areas for authentication. Similarly there are so many empty slots for new scientific research to explore the hidden treasure of nature against pathogens and diseases.

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