Ethno-Botanical Appraisal and Uses of Specific Valuable Therapeutic Plant in District Kalat, Balochistan Pakistan: Gender-Base Prospect

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Abstract:
In order to improve the socio-economic condition of the nomadic peoples the present study was carried out. Kalat district was selected as purposively due to the rich biodiversity of therapeutic plants and ethno-medicinal culture of the native communal. A descriptive type of survey research design was carried out. 127 informants among the 85 plant collectors (females), 17 forestry department staff and 10 herbal practitioners were cross-examined through the simple random sampling procedure. The sample size of both population were determined by using the Fitzgibbon & Morris (1987) and Krejcie and Morgan (1970) table of "selecting sample sizes for research activities" at the 0.05 percent conceivable error rate. The results reveals that the most (40 percent) of the respondents were fall in the age categories 36 to 40 years. Most (46 percent) of the respondents were illiterate. Perceived score of the common plant collectors was (M=3.76) and ranked first similar, perceived score of the Forestry Department respondents and herbal practitioners were: plant resources (M=4.04) and ranked order was first. Significant discrepancy and deviation were found five out of six categories. Most (44 percent) of the respondents were of the view that they vended plant for medicinal purpose. Based on achieved outcomes following recommendations were suggested. Check and balance system concerning illegal selling of medicinal plants should be imposed in order to provide the halt for valuable medicinal plant extinct and cultivate the valuable plants at a greater extent. Better strategic marketing of the medicinal plants perhaps accelerate the income of the Pupu/Hakims/individuals, it is therefore, suggested that the government should be provided the technical facility, guide line and advice for the nomadic peoples particular females so as to upsurges their socio-economics conditions and livelihood options.

Keywords: *ethno-botanical, appraisal, therapeutic plant, Kalat, Balochistan.*

OVERVIEW:

Commencing across the Africa to the Red Sea from corner of Arabian Peninsula, to southern Balochistan, Sindh province of Pakistan and India, there was incredible homogeneous zone of floras, shrubberies and vegetation's (Eig, 1931-1932). Pakistan country considered as specific locations about distinctiveness of biodiversity whereby such an inimitable microclimate, unique ecological zones, wide range, numerous and existence of flora species. However, in Pakistan round about six thousand (6000) plants and medicinal floras were commonly found. A substantial quantity of genera and various species were befalling transversely occurred in Pakistan. It was assessed and predictable in the early of nineteen fifties that up to eighty four (84%) of the Pakistani population eventually depended on traditional medicine.

Balochistan province considered as the largest province of Pakistan, which contributes virtually (43%) land mass of the country. The environment is parched to semi-arid, which was stretching from coastal belt; tropical to cool temperate in the northern part. Further, Balochitan province had look upon as an innate home of certain herbal and medicinal plants. Whereas, innumerable wild floras had naturally been existed and wildly dispersed. In this regard, moreover, precise and partial technical knowledge have been accessible regarding therapeutic floras (herbs) and their utilization or application at local level. In addition, vulnerability and susceptibility of medicinal floras had to be reaching extinction either over-exploitation or unanticipated drought incantation

(Khan and Aslam, 2004). Balochistan province had existed in the Saharo-Sindian zone; the cultural groups alive across this infinite area are assorted. Various cultures and traditions was breathing in the Saharo-Sindian zone and their livelihood options revolved around agriculture and depend on indigenous medicinal herb resources. Still, significant portion of the population of the Balochistan were used herb plants for their illness.

Kalat district were considered as a smallest district in Balochistan as area-wise which constitutes the area of 6,622 square kilometers, comprising two sub-divisions, i.e. Kalat and Surab, five (5) tehsils namely Kalat, Mangochar (Khaliqabad), Johan, Gazgz, Surab and eighteen (18) UCs together with 81 Patwar circles and 614 Mauza (GoB, 2011). Kalat district encompasses of lofty valleys and hills. The old town, inside *Mīrī* (castle), holding the citadel of the Khan was moderately and somewhat were demolished by (1935) massive earthquake. The weather at district was dry in summer and rigorously frigid and chilly in the winter. Main period of rain is between December and February, and the summer rains related with the Indian Ocean monsoon are nominal. Heavy snowfall was experienced in the Kalat city due to the higher elevation. The spring season was the utmost pleasurable and autumn period remnants mild throughout day time and becomes cold at night time (GoB, 2011).

The Kalat district embraces heaving area and enormous potential in the light delta and pome fruits. The soil is productive reddish color and called malt. In this regard, with the term of non-irrigated tracts, the soil of Narmuk is the furthermost virgin soil. The second quality of soil is generally characteristic by dark loam, generally found in the irrigated areas. Particularly, on the slope Harboi Mountain and range, the Juniper (*Junipers Excelsa*), Khanjal (*Pistacia Cabalica*), Mash monk (*PrunusEburnea*), and Archin (*Pranusamyydalug*) were grown on naturally. Enormous herbs, wild onion, wild briar, zira (cumin seed) and tulips were also wildly distributed in Kalat district.

The flora in the Kalat and Harboi mountains was definitely changed from the other areas of the province. The higher hills slopes have dispersed groves of J*uniperus excelsa, Pistacia khinjuk, Oleafer ruginea*, although valleys and water catchments have a comparatively extensive diversity of vegetation. On the other hands, the minor slopes have areas of herbaceous floras, predominantly in the spring, that are categorized through numerous types of *Consolida, Adonis, Astragalus, Lallemantia, Sisymbrium, Alyssum, Heliotropium* and *Euphorbia*. Best distinguished forage grasses in the area include species of *Bromus, Phalaris, Cymbopogon* and *Boissiera squarrosa*. The bulbous, tuberous, and rhizomatous plants were also grown such as *Allium, Tulipa, Dispcadi, Muscari, Asparagus, Gagea, Scorzonera* and *Juncus*. However, alluvial soils were the predominate medium in valleys, and condensed vegetation of herbaceous like Artemisia spp, *Nannorhops ritchiana, Acacia* spp., *Capparis decidua*, and *Calotropis procera* were found abundantly. Traditionally, the district had wide ranges and areas concealed by abstemiously opaque of Juniper forests with wild ash and wild pistachio at upper elevations (GoB, 2011).

Henceforth, pulverized was cover-up and constituted mainly by (*Stipa himalacia), (Dichanthium annulatum), (Chrysopogon aucheri), pennesitum orientale, pennesitumflaccidum, Stipa capillata, Stipa cabulica, Leptorhabdos benthamiana* and *(Cymbopogon spp*.). From the above mentioned flora, Kala Zira *(Carum bulbocastanum)* was used as spice and fetches high value in the market. In addition, Oman (*Ephedra nebrodensis*) and Khakshir (*Sisymbrium sophia)* was also found in large quantity and have medicinal value (GoB, 2011). The apprehensions and problems concerning the protection and up keeping of the precious herbs and floras by over-grazing and other human activities could be addressed through the variability of events such as mass awareness campaigning. Keeping in the view there was dire need to protect and conserve the herbal medicines in systematic mode so as to boast-up foreign exchange.

PROBLEM SETTING:

Intensification of population expansion, environmental degradation, tremendous pressure on exiting forests, soil erosion, over grazing of nature pasture, indiscrimination uses of underground water, cutting of trees for fuel and wood emerged as one of the most imperative issues and created the ecological instability not only at Kalat

district but also alarming situation at province level. The floras have eradicated even extinct at a greater extent at due to the human activities, environmental factors, prolong drought spell and so forth. Due to nonexistence of mass awareness campaigning among the grassroots level a trivial part has been preserved. In this regard, the botanical community at district level had functionless either delineated for convenience or presenting ethno botanical facts and figures. However there was need felt who to conserve the medicinal floras, and made the long as well as short term strategies so as to protect the national wealth which was edge of vulnerability and susceptibility. Keeping in the view above mention facts, the present study was designed in order to explore to ethno botanical appraisal and uses of specific valuable therapeutic plant so as to measure the ethno botanical panorama regarding particular therapeutic floras in district Kalat, Balochistan province, Pakistan.

OBJECTIVES:

Following were the specific objectives of the study.

1 To find out the biographic information of the informants in the study areas.
2 To determine the local gen and know-how of folklore floras as used for the herbal treatment.
3 To examine the therapeutic plant usages as perceived by the respondents.
4 To develop concrete recommendations based on achieved outcomes.

REVIEW OF RELATED LITERATURE:

Dar (2003) conducted the study about ethno-botanical exploration in Lawat district Muzaffarabad, Azad Jammu and Kashmir Pakistan. Author prepared the checklist of fifty two species so as to identifying the medicinal plant and their usages. Ushimaru *et al.,* (2007) conducted the study regarding evaluating and extracting of particular medicinal plants about in-vitro antimicrobial activity of methanolic in contradiction of *Escherichia coli, Salmonella Typhimurium, Staphylococcus Aureus* and *Enterococcussp.* They further reported that the methanolic extract of *Caryophyllus aromaticus* as a maximum effective. Qasim *et al*., (2010) evaluated the ethnobotanical study in coastal plants from Hub, Lasbela District, Balochistan. In this regard, collect evidence regarding ethnobotanical as used by native people. They observed that forty eight wild coastal plant species among twenty six families. They further denote the *Poaceae, Amaranthaceae (Chenopodiaceae), Mimosaceae* and *Convolvulaceae* were frequently used species, in this connection, about fifty six percent of collected floras were halophytes and rest of them were xerophytes. They further, checked the twelve diseases and identified the various plant parts as used by medicinal purpose. They concluded based on recommendation that both the government and NGOs should be promoted and encouraged to capitalize in these medicinal plants for economically purposed. Tareen *et al.,* (2010) conducted the study about indigenous knowledge of folk medicine by the women of Kalat and Khuzdar regions of Balochistan, Pakistan. Researchers reported that sixty one species of medicinal plants belonging to fifty six genera of thirty four (34) families was conventionally used as medicines by the females for the cure of numerous illnesses. Due to the ethno botanical activities the worldwide trends about herbal medicine renaissance for the native community has been started. They concluded that traditional information may use for conservation of medicinal plants. Khan *et al*., (2012) assessed the ethno botanical knowledge of local people in Poonch valley, Azad Kashmir. Receipt specimens were placed at in the Quaid-i-Azam University Herbarium Islamabad. They reported that fifty six medicinal plant species belonging to thirty six families was recoded. Researchers further found and recorded the vernacular names, family names, uses of plants part. In the study areas *Acanthaceae, Asteraceae*, *Liliaceae, Ranunculaceae* and *Verbenaceae* were the most prominent families, although *Brassicaceae, Mimosoideae, Caesalpinaceae and Cyperaceae* were virtually absent. They concluded that indigenous information concerning to the recorded species usages came from women aged between the twenty nine and fifty. Zereen, & Zaheer-Ud-Din (2012) carried out the study regarding ethno botanically important trees of Central Punjab, Pakistan so as to check the perceptions of the informants in the 8 districts of Punjab i.e. Nankana Sahib, Sahiwal, Sialkot, Vehari, Lahore, Faisalabad, Narowal and Pakpattan. They reported that through the local population forty eight herbal species belonging to

twenty three families was identify, along with their proper usage for instance medicine, fodder, fuel, vegetables, fruits, timber and the like. Bazai *et al.,* (2013) investigated and applied the participatory rural appraisal methodology in 5 villages (Killi Tor Shore; Medadza; Ghunda; Kala Ragha, & Killi Shaban) in district Ziarat, Balochistan. The PRA tools were used in the present study like social mapping, transit walks, semi-structured questionnaire and pie diagrams. The finding revealed that the socio-economic circumstances and livelihood options of the rural population were depended on the forestry resources agriculture sector and livestock. They concluded that the high anthropogenic pressure on the ecosystem can be reduced by regulation, service implementations as well financial assistance. Khan *et al.,* (2013) study the common weeds of district Bannu, Khyber Pakhtunkhwa Pakistan. In this connection, twenty seven weed species were collected for the purpose of ethno botanical learning along with nineteen different families at district level. Researchers further reported that these species were preserved with the help of mercuric chloride, however, recognized and placed in the herbarium of Government College Kakki Bannu Khyber Pakhtunkhwa Pakistan. In addition, through the comprehensive questionnaire eighty informants were preparing according to their local inhabitants, herbalists and Pansaries. Authors further reported that in present ethno botanical study these weed species were fairly effective remedies for different diseases like diabetes, toothache, intestinal diseases, dysentery, headache, diarrhea, fever, urinary tract, jaundice, bleeding piles, skin disorders, asthma and cough. Mehmood *et al*., (2013) carried out the study about the usages of medicinal plants (Unani medicine) in district Bannu. In this connection, thirty five Unani medicines were settled methodically with the term of name, product, parts used in drugs and determination of their uses. Sarangzai *et al*., (2013) conducted to the study about floristic composition and some folk uses of medicinal herbs in Ziarat District Balochistans. They observed and collected the ninety plant species belonging to thirty five families which were used for the medicinal plant by local people for numerous infirmities. Authors also reported that indigenous people were used medicinal herbs for the cure of various diseases and disorder. Indiscrimination of vegetation, over grazing, merciless collection of medicinal plants has created to threaten their extinction. Song *et al.,* (2013) carried out the ethno-pharmacological survey of medicinal plants in Jeju Island, Korea. They further, observed/ identified the sixty eight families, one hundred forty one genera, one hundred seventy one species and there uses. Naz *et al*., (2014) surveyed the ethno-taxonomical observation of some selected medicinal plants in district Attock, KPK, Pakistan. Researchers developed to spread the dynamic of native knowledge, discover, marmalade and manuscript therapeutic floras. However, 8 medicinal floras species within sixty four genera were used medicinal purpose and illness such as asthma, piles, tumor, skin syndromes, diabetes, cough, jaundice, swelling and kidney stones.

MATERIALS AND METHODS:

Kalat district was selected as purposively due to the rich biodiversity of therapeutic plants and ethno-medicinal culture of the native communal (Goodman and Ghafoor 1992). The ethno-botanical used was document by interviewing the indigenous folks including common plant collectors (85) (females), forestay department staff (17) and herbal practitioners (10) so as to probe the series-questions of (closed ended and open-ended) regarding old-style uses of plants their identification, patois names plant resources, quantities used, rate of consumption, availability and percentage of plants species found and their consumption by the local people. However, frequently due to the linguistic and semantic constraints the data and figures were communicated in the indigenous dialect (Brahvi). Nevertheless, ethno-botanical list or inventory was develop in order to denote the botanical names, vernacular local names; use for disease and their practical applications (Durrani and Manzoor, 2006; Manzoor *et al*., 2013). Curative plants were gathered properly from different places and location such hills, plains and water courses of the respective districts. The plant species was acknowledged with the help of Flora of Pakistan (Nasir & Ali, 1970-1989; Ali & Nasir, 1990-1992; Nasir & Rafiq, 1995; Ali & Qaisar, 1992-2010). Descriptive type of survey research design was carrying out in field work. Nearby, 127 respondents or informants were cross-examined through the simple random sampling. The captured data was collect through the structured questionnaire based on the responses received from the informants regarding ethno-botanical information at several potential areas of district Kalat. The sample size of the population were determined by using the Fitzgibbon & Morris (1987) and Krejcie and Morgan (1970) table of "selecting sample

sizes for research activities" at the 0.05 percent conceivable error rate. Proximate the perception of the informants were recorded on the base of 5-point Likerts scaling from highest to lowest. In this connection, the percentages, mean scores, standard deviation, standard error, rank orders was calculate at 0.05 level (confidence interval for the mean) was consider significant, by using the separate sheet of Excel 2010, and then put in the Statistical Package for Social Sciences (SPSS V 22). While, One-Way-ANOVA analysis of variance for a quantitative dependent variable was use so as to signify the informant's perceptions variation. Detail methodological procedure by chronically arranged as shown in table-1.

Table 1: Detail of time-line frame quarter activities.

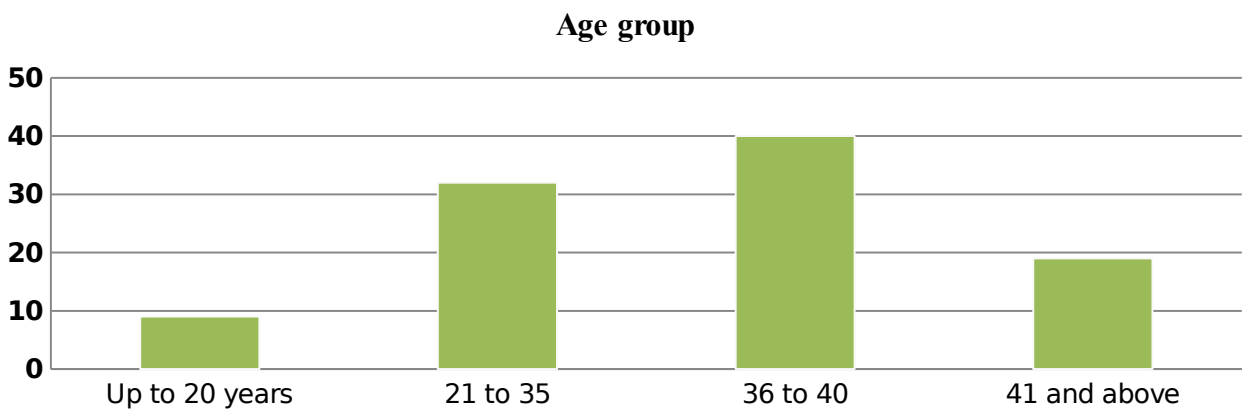
Priority setting of the methodology	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jun	Feb	Mar	Apr	May
Introduction plus finales objectives												
Draft review of related literature												
Design research strategy or methodology												
Administered questionnaire or strategy												
Pilot test & revise questionnaire												
Data collection procedure												
Datum base, entry, and coding												
Data analysis												
Update and apprise literature												
Final report writing												
Miscellaneous												

RESULTS AND DISCUSSIONS:

Socio-economic variables

Socio-economic characteristics were considered as the dominate ingredients in decision-making power and most influential, authoritative and encouragement tools in any organizations step. Keeping in the view importance of the socio-economic characteristics, the present empirical research was checked the socio-economic characteristics and profile.

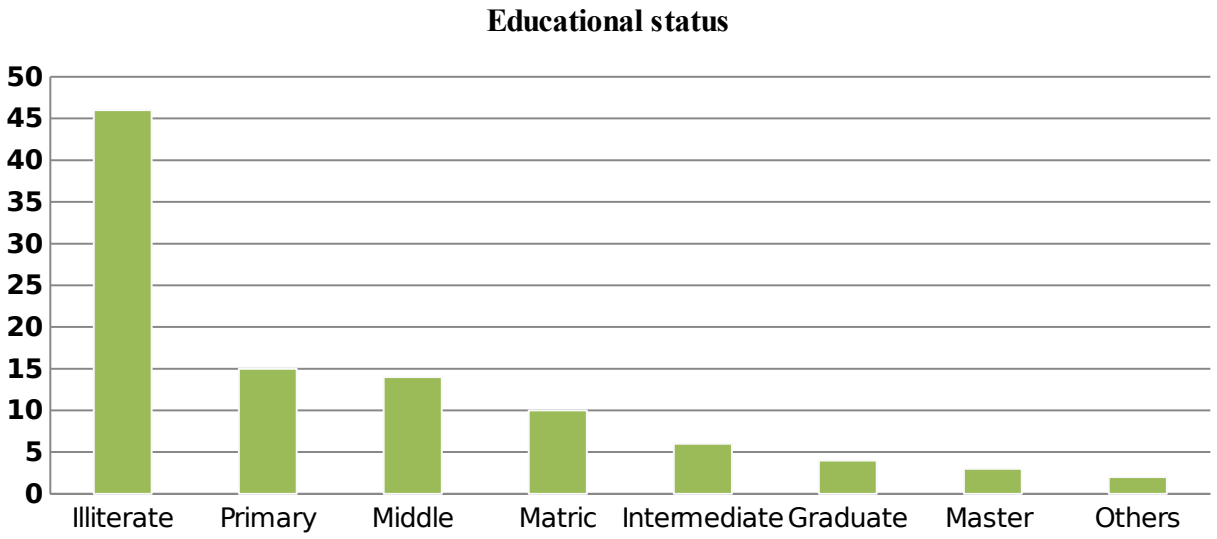
Figure 1: Socio-economic characteristics of age group.



Field data (2015-16)

The data obtaining from the field as age-wise depicted that most (40 percent) of the respondents were fall in the age categories 36 to 40 years, followed by 21 to 35 years of the respondents denote their perceptions about the age categories i.e. (32 percent) as shown is table-1. While only 9 percent of the respondents having age up to 20 years.

Figure 2: Socio-economic characteristics of educational status.



Field data (2015-16)

The data reading the educational status revels that the most (46 percent) of the respondents were illiterate, followed by (15 percent of the respondents have achieved the education at primary level as shown in table-2. While minor number (14-10 percent) of the respondents had achieved the education at middle and matriculation level respective. Only (3 percent) of the respondents have holding master degree.

Table 3: Perceived score of the respondents regarding medicinal plant utilization.

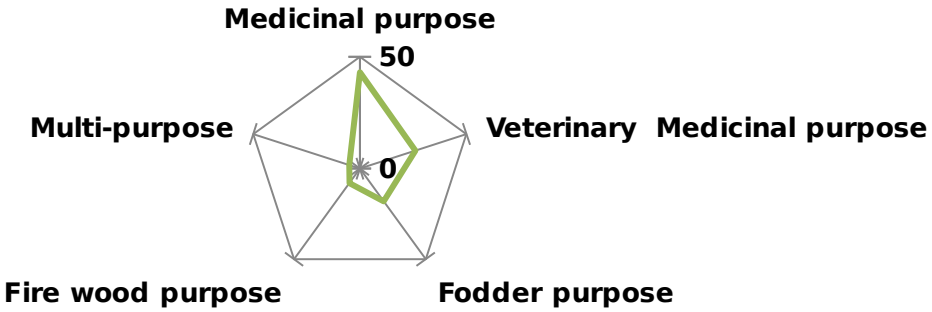
Categories	Common plant collectors			Forestry Deptt: Staff/ HP*			Mean Square	t-vales**
	M	*SD*	*RO*	*M*	*SD*	*RO*		
Rate of consumption	2.84	1.05	5th	3.74	.859	2nd	1.026	16.37**
Availability of plants species	2.45	.92	6th	3.73	.165	3rd	.826	41.07**
Plant resources	3.29	1.06	2nd	4.04	.808	1st	1.024	11.04**
Plant quantities	3.25	12.0	3rd	2.15	1.19	6th	1.44	17.09**
Old-style uses of plants	3.19	1.12	4th	2.85	1.06	4th	1.24	1.80NA
Plant marketing	3.76	.99	1st	2.18	1.21	5th	1.103	16.76**

Weighbridge: **: 1= Strongly disagree, 2= Disagree, 3= Undecided, 4= Agree, 5= Strongly agree: Herbal practitioners*
Significant at 0.05 level

Kalat district has diverse potential and rich biodiversity regarding fauna and flora; in this regard the respondents were asked to provide their intuitions regarding the medicinal plant utilization as shown in table-3. The perceived perceptions of the respondents were checked on 5-point Likert scale. Significant differences were signifying at 0.05 probability level. The perceived score of the common plant collectors (respondents) were: plant market (M=3.76), plant resources (M=3.29) and plant quantities (M=3.25) were ranked first, second and third

respectively. However, rate of consumption (M=2.84) and availability of plants species (M=2.45) at the bottom of the raking and ranked fifth and sixth respectively. On the other hands, perceived score of the Forestry Department respondents and herbal practitioners were: plant resources (M=4.04), rate of consumption (M=3.74) and availability of plants species (M=3.73) were ranked first, second and third respectively. While plant marking (M=2.18) and plant quantities (M=2.15) at the bottom of the raking and ranked fifth and sixth respectively. Significant discrepancy and deviation were found five out of six categories. Thus it was concluded that the plant marketing and plant resources was the imperative variables. As compare to Forestry Department respondents and herbal practitioners, the common plant collectors have more strength about medicinal plant utilization.

Figure 3: Proportional quantity of species as per usage category.



The imperative aspects of the present study were to check the respondent's perceptions about the utilization of medicinal plant as shown in figure-3. Most (44 percent) of the respondents were of the view that they vended plant for medicinal purpose. Almost (28 percent) of the respondents were agreed that they have trade the plant for veterinary medicine purposes. However, (19 percent) of the respondents were of view that they sold the plant as fodder purpose for domestic animals.

Table 4: Comprehensive taxonomic description of medicinal plant species at district level.

S. No	Family / botanical name	Local name	Locality	Uses as folk medicinal
1	*Ephedraceae*	Narom	Between Nichara and Kalat	To tan animal hide for water sacks and butter-churning containers
2	*Cupressaceae*	Apursk	Between Nichara and Kalat	To relieve fever of all sorts
3	*Alliaceae*	Pimalako	Kalat area	Used as a general condiment
4	*Polygonaceae*	Soeris	Kalat area	Important camel fodder
5	*Papaveraceae*	Purpad	Kalat area	The fresh leaves are eaten raw as a vegetable
6	*Crucifereae*	Jambo	Kalat area	Oil extracted, used for cocking , hair lotion and important fodder
7	*Erysimum griffithianum Boiss.*	Not recorded	Kalat area	Important camel fodder
8	*Zygophyllaceae*	Karkawag	Johan and Kalat areas	Liver ailments
9	*Myrtaceae*	Mort	Kalat area	Preventative against rash and to relieve acute stomach pain
10	*Oleaceae*	Khat or Khot	Nichara and Kalat	To relieve diarrhea and also used as green tea
11	*Onosma Limitaneum I.*	Charmang	Johan and Kalat	To relieve chest congestion
12	*Compositae*	Boi madran	Nichara and Kalat	Relieve to stomach pain
13	*Hertia intermedia*	Monguli	Kalat area	As an insect repellent
14	*Microcephala lamellata*	Pimpli babuna	Kalat area	To relived fever
15	*Papilionaceae*	Khawasdar	Kalat area	To throat dryness and tonic of heat
16	*Tribulus terrestric*	Ghur gan	Kalat area	To relived urinary tract irritation
17	*Artemisia turanica*	Surkh jir	Kalat area	Fever and skin diseases, stomach pain

	krasch			
18	*Salvia Cabulica Benth.*	Mateto	Nichara and Kalat area	To treat dehydration

CONCLUSION AND RECOMMENDATIONS:

Balochistan was the un-privileged province of the county but having robust potential with the term of their natural resources, fauna and flora. The socio-economic condition of the nomadic peoples was directly or indirectly revolves around collection of medicinal plant and their marketing. The results reveals that the most (40 percent) of the respondents were fall in the age categories 36 to 40 years, followed by 21 to 35 years of the respondents denote their perceptions about the age categories i.e. (32 percent). Most (46 percent) of the respondents were illiterate, followed by (15 percent of the respondents have achieved the education at primary level. The perceived score of the common plant collectors (respondents) was: plant market (M=3.76), ranked first similar, perceived score of the Forestry Department respondents and herbal practitioners were: plant resources (M=4.04) ranked first. Significant discrepancy and deviation were found five out of six categories. Most (44 percent) of the respondents were of the view that they vended plant for medicinal purpose. Based on outcomes following recommendations were suggested or put forward. Check and balance system concerning illegal selling of medicinal plants should be imposed in order to halt valuable medicinal plant extinct and cultivate the valuable plants at greater extent. Better strategic marketing of the medicinal plants perhaps accelerate the income of the Pupu/ Hakims/ individuals, it is therefore, suggested that government should be provided the technical facility, guide line and advice for the nomadic peoples particular for females plant collectors so as to upsurges their socio-economics conditions and livelihood options.

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