



A Review on Traditional Medicinal Uses of Animals and their Product in Human Body Pain Related Problems

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ABSTRACT

In a review study, we were included 20 published research papers of various authors on zootherapeutic studies in India. In this study we were collected information regarding the animals which are uses as complementary medicine. This work is also an attempt to present a list of animals reported for uses in various kind of body pain related problems by different communities of India. In this study, we are also discussing on why majority of animals or their part or byproducts are uses for pain related problems in complementary medicines.

After the detailed database, we find 51 animals are reported for the 55 complementary medicinal uses for the pain related problems i.e. Body pain, Sprain, Rheumatism, Muscle pain, Headache, Sprain, Bone fracture, Arthritis, Internal Pain etc. The mammals constitute the highest number of animals used for this medicinal purpose. 26 (51%) mammals, 8 (15%) invertebrates, 6 (12%) birds, 7 (14%) reptiles, 2 (4%) fishes and two (4%) amphibians have been reported for diverse kind of pain in India. Of the total 51 animal species reported, 36 (70%) are included in IUCN red data list with 2 endangered, 5 vulnerable, 10 near threatened, 21 least concern categories. 14 (28%) animal species are listed in CITES appendix I, II, and III.

Keywords: Traditional Medicine, Body pain, animal product

Background

Since ancient times Animals, their parts, and their products have constituted part of the inventory of medicinal substances used in various cultures [Lev, 2006]. The Traditional medicine (TM) is a comprehensive term used to refer both to systems such as traditional Chinese medicine, Indian Ayurveda and Arabic Unani medicine, and to various forms of indigenous medicine. In Traditional Chinese Medicine (TCM), more than 1500 animal species have been recorded to be of some medicinal use [CNCTHM, 1995]. In India, nearly 15-20 percent of the Ayurvedic medicine is based on animal-derive substance [Unnikrishnan, 1998]. In Unani system of medicines about 200 drug of animal origin are described which are claimed to be beneficial for the treatment of the various ailments [Sharma M P, 1996]. In the Ayurveda there is description of use of several animal based drugs particularly from cow, buffalo, camel, ass, goat and sheep [Pandey, 1996]. World health organization estimates that as many as 80% of the world's more then six billion people rely primarily on animal and plant based medicine [WHO, 1993]. It is well known that the annual global trade in animal-based medicinal products accounts for billions of dollars per year [Kunin and Lawton 1996]. The investigation of traditional medicines has proven a valuable tool in the developing art of bioprospecting for pharmaceutical compounds. The World Health Organization has selected 252 essential chemicals of which 11.1% are derived from plants, and 8.7% from animals (Marques 1997). Of the 150 prescription drugs currently in use in the United States of America, 27 have animal origin [World Resources Institute 2000]. This study deals to summarized and review on the zootherapeutic practices by the different ethnic communities of India. This work is an attempt to present a list of animal's uses for diverse kind of pain by different communities of India. The authors hope that this work will be helpful in biodiversity conservation in India and also give a clue to investigate bio-active compound in these animal raw materials.

Method

In this review study, data were gathered from 20 published research papers of various authors on zootherapeutic studies in India (Table 1). Information's were collected regarding the animals which are uses as complementary medicine. This work is also an attempt to prepare a database of animals reported for uses in various kind of body pain related problems by different communities of India. We were included only valid scientific names of the animal's species in the database. These data are updated according to the ITIS Catalogue of Life: 2012, Annual Checklist (<http://www.catalogueoflife.org/search.php>) and NCL Centre for Biodiversity Informatics (NCBI) (<http://www.ncbi.org.in>). The conservation status of the animal species follows IUCN (2012) (<http://www.iucnredlist.org>) and CITES (2012) (<http://www.cites.org/eng/resources/species.html>). We are also discussing on why majority of animals or their part or byproducts are uses for pain related problems in complementary medicines.

Table 1 – List of published research works on Ethnomedicinal usage of animals in different parts of India.

	Tribes/Ethnic Groups/Region/ Indigenous people	Authors
1.	Bhil of Rajasthan	Sharma S K (2002)
2.	Bhil, Gamit, Kokna , etc of Maharashtra	Patil S H (2003)
3.	Bhopalpatnam (chhattisgarh)	Oudhia P (2003a)
4.	Chhattisgarh	Oudhia P (2003b)
5.	Chhattisgarh	Oudhia P (1995)
6.	Kachchh (Gujrat)	Gupta Leena (2003)
7.	Irular, Kurimba of Tamilnadu	Solvan A <i>et al.</i> (2004)
8.	Kanikar, Paliyar of Taminadu	Ranjit Singh (2004)
9.	Naga tribe of Nagaland	Jamir N S <i>et al.</i> (2005)
10.	Ao tribe of Nagaland	Kakati L N (2006)
11.	Mogya, Meena, Bawaria of Rajasthan	Mahawar, Jaroli (2006)
12.	Shoka tribe of Uttaranchal	Negi and palyal (2007)
13.	Saharia of Rajasthan	Mahawar, Jaroli (2007)
14.	Santhal, Kol, Bhumija of orissa	Mishra <i>et al.</i> (2011)
15.	Irular, Mudugar, Kurumbar tribe of Westren Ghat	Padmanabhan, Sujana, (2008)
16.	Todas, Kotas, Badaga, Kolam Of South India	Dixit <i>et al</i> (2010)
17.	Nyishi and Galo tribes in Arunachal Pradesh	Chakravorty (2011)
18.	<i>Koya and guthikoya tribe of Eturunagaram sanctuary</i>	Benargee (2010)
19.	Garasiya tribe of rajasthan	Jaroli, <i>et al.</i> (2010)
20.	Dibrugarh District, Assam	Kalita <i>et al.</i> (2005)

Result

After detailed study of 20 published research papers, a database prepared and find that 51 animals are uses in 55 pain related complementary medicinal purposes i.e. Body pain, Sprain, Rheumatism, Muscle pain, Headache, Sprain, Bone fracture, Arthritis, Internal Pain etc (Table II, III).

Table II- List of animals reported for pain related medicinal purposes with their red data status in different parts of India.

S. No.	Animal Group	English Name	Scientific Name	Red data status	CITES
1.	Invertebrate	Honey bee	<i>Apis cerana indica</i> (Fabricius 1798)		
2.	Invertebrate	Honey bee	<i>Apis dorsata</i> (Fabricius, 1793)		
3.	Invertebrate	Honey bee	<i>Apis florea</i> (Fabricius, 1787)		
4.	Invertebrate	Earthworm	<i>Pheretima posthuma</i> (L.Vaillant, 1868)		
5.	Invertebrate	Scorpion	<i>Heterometrus swammerdami</i> (Simon, 1872) Synonym - <i>Palamnaeus swammerdami</i>		
6.	Invertebrate	Lac insect	<i>Kerria lacca</i> (Kerr, 1782) Synonym- <i>Laccifer lacca</i>		
7.	Invertebrate	Jumping spider	<i>Plaxippus paykulli</i>		
8.	Invertebrate	wasp	<i>Vespa orientalis</i>		
9.	Pisces	Channa	<i>Channa punctata</i> (Bloch, 1793) Synonym- <i>Channa punctatus</i> Linn.	Least concern	
10.	Pisces	Hammer head shark	<i>Eusphya blochii</i> (Cuvier, 1816) Synonym- <i>Zygaena blochii</i>	Near threatened	
11.	Amphibia	Frog	<i>Fejervarya limnocharis</i> synonym- <i>Lymnonyctes limnocharis</i>	Least Concern	
12.	Amphibia	Frog	<i>Rana sp</i>	Least Concern	
13.	Reptile	Common Garden Lizard	<i>Calotes versicolor</i> (Fitzinger, 1826)		
14.	Reptile	Cobra	<i>Naja naja</i> (Linnaeus, 1758)	Least Concern	II
15.	Reptile	Python	Python molurus	Near threatened	II

S. No.	Animal Group	English Name	Scientific Name	Red data status	CITES
16.	Reptile	Python	<i>Python reticulatus</i> (Schneider, 1801)	Near threatened	II
17.	Reptile	Spiny tailed lizard	<i>Uromastix hardwickii</i> (Gray, 1827)	Near Threatened	II
18.	Reptile	Monitor	<i>Varanus bengalensis</i> (Daudin, 1758)	Least Concern	I
19.	Reptile	Monitor	<i>Varanus salvator</i> (Laurenti, 1768)	Least Concern	
20.	Aves	Necked Hornbill	<i>Aceros Nipalensis</i> ,	Vulnerable	
21.	Aves	Pied hornbill	<i>Anthacoceros coronatus</i>	Near Threatened	
22.	Aves	Great Hornbill	<i>Buceros bicornis</i>	Near Threatened	
23.	Aves	Crow-pheasant	<i>Centropus sinensis</i> (Stephens, 1815)	Least concern	
24.	Aves	Hen	<i>Gallus gallus domesticus</i>	Least concern	
25.	Aves	Eagle	<i>Spilornis cheela</i>	Least Concern	
26.	Mammal	Bison	<i>Bison bison</i> (Linnaeus, 1758)	Near Threatened	II
27.	Mammal	Mithun	<i>Bos gaurus</i> (H. Smith, 1827) <i>Synonym- Bos frontalis</i>	Vulnerable	
28.	Mammal	Cow	<i>Bos taurus</i> (Linnaeus, 1758) <i>Synonym- Bos indicus</i>		
29.	Mammal	Buffalo	<i>Bubalus bubalis</i> (B. arnee) (Linnaeus, 1758)		
30.	Mammal	Camel	<i>Camelus dromedarius</i> (Linnaeus, 1758)	Least concern	
31.	Mammal	Jackal	<i>Canis aureus</i> (Linnaeus, 1758)	Least concern	III
32.	Mammal	Dog	<i>Canis lupus familiaris</i> (Linnaeus, 1758) <i>Synonym- Canis familiaris</i>		
33.	Mammal	Goat	<i>Capra sibirica</i> (Pallas, 1776)	Least concern	
34.	Mammal	Shambhar deer	<i>Cervus unicolor</i>	Vulnerable	
35.	Mammal	Indian wild ass	<i>Equus hemionus khur</i> (Lesson, 1827)	Endangered	II
36.	Mammal	Cat	<i>Felis catus</i> (Linnaeus, 1758) <i>Synonym- Felis domesticus</i>	Least concern	
37.	Mammal	Hanuman Monkey	<i>Semnopithecus entellus</i> <i>Synonym- Presbytis entellus</i>	Least concern	I
38.	Mammal	Brown mongoose	<i>Herpestes fuscus fuscus</i>		
39.	Mammal	Striped Hyena	<i>Hyaena hyaena</i> (Linnaeus, 1758)	Near threatened	
40.	Mammal	Porcupine	<i>Hystrix indica</i> (Kerr, 1792)	Least concern	
41.	Mammal	Common otter	<i>Lutra lutra</i> (Linnaeus, 1758)	Near Threatened	
42.	Mammal	Monkey	<i>Macaca mulatta</i> (Zimmermann, 1780)	Least concern	II
43.	Mammal	Beer	<i>Melursus ursinus</i>	Vulnerable	I
44.	mammal	Banded Mongoose	<i>Mungos mungo</i>	Least Concern	
45.	Mammal	Rat	<i>Mus musculus</i>	Least Concern	
46.	Mammal	Clouded leopard	<i>Neofelis nebulosa</i>	Vulnerable	
47.	Mammal	Panther	<i>Panthera pardus</i> (Linnaeus, 1758)	Near Threatened	I
48.	Mammal	Tiger	<i>Panthera tigris</i> (Linnaeus, 1758)	Endangered	I
49.	Mammal	Toddy cat	<i>Paradoxurus hermaphroditus</i>	Least concern	III
50.	Mammal	Indian Wild boar	<i>Sus scrofa cristatus</i>	Least concern	
51.	Mammal	Pig	<i>Sus scrofa domestica</i>	Least concern	

Table III- Animals and their products used in human diverse kind of pains in India.

S. No.	Animal Group	English Name	Scientific Name	Tribe/ Inhabitant/ Region	Parts used	Disease	Method of preparation and medicinal use	Related reported authors in india
1	Invertebrate	Honey bee	<i>Apis cerana indica</i> (Fabricius 1798)	Tirunelveli district, Tamil Nadu	Wax	Rheumatic pain.	Applied externally.	Ranjit Singh et al. (2004)
2	Invertebrate	Honey bee	<i>Apis dorsata</i> (Fabricius, 1793)	Tirunelveli district, Tamil Nadu	Wax	Rheumatic pain.	Applied externally.	Ranjit Singh et al. (2004)
3	Invertebrate	Honey bee	<i>Apis florea</i> (Fabricius, 1787)	Tirunelveli district, Tamil Nadu	Wax	Rheumatic pain.	Applied externally.	Ranjit Singh et al. (2004)
4	Invertebrate	Earthworm	<i>Pheretima posthuma</i> (L.Vaillant, 1868)	Irular, Mudugar, Kurumbar tribe of Westren Ghat	oil	Muscular pain	Oil used in muscular pain	Padmanabhan, and Sujana, (2008)
5	Invertebrate	Scorpion	<i>Heterometrus swammerdami</i> (Simon, 1872) Synonym - <i>Palamnaeus swammerdami</i>	Ao, Angami, Sema, Khiamniungan, Chakhesang, Lotha, Zeliang, Sangtam, Konyak tribes of Nagaland.	whole body	Rheumatic joints pain	The whole body is boiled in mustard oil and the extract so prepared is used for massaging to relieve rheumatic joints pain.	Jamir and Lal (2005) Padmanabhan, and Sujana, (2008)
6	Invertebrate	Lac insect	<i>Kerria lacca</i> (Kerr, 1782) Synonym- <i>Laccifer lacca</i>	Tirunelveli district, Tamil Nadu	shellac	Rheumatism	Powdered shellac is mixed with honey and is used as remedy for caries. "Lakshadi Thaila", used to bring down chronic fevers and to cure rheumatism has shellac as its main ingredient.	Ranjit Singh et al. (2004)
7	Invertebrate	Jumping spider	<i>Plaxippus paykulli</i>	Badaga, Kolam Of South India	whole	Acute muscular pain		Dixit et al (2010)
8	Invertebrate	wasp	<i>Vespa orientalis</i>	Todas, Kotas, Badaga, Kolam Of South India	whole	Inflammation and pain	Groun mustard oil, honey and salt	Dixit et al (2010)
9	Pisces	Channa	<i>Channa punctata</i> (Bloch, 1793) Synonym- <i>Channa punctatus</i> Linn.	Dibrugarh District, Assam	Edible portion of the fish	Body pain	Curry prepared from fishes.	Kalita (2005)
10	Pisces	Hammer head shark	<i>Eusphyra blochii</i> (Cuvier, 1816) Synonym- <i>Zygaena blochii</i>	Kachchh	Fat	Joints pain	Fat is applied externally for treating joints pain.	Gupta Leena et al. (2003)
11	Amphibia	Frog	<i>Fejervarya limnocharis</i> synonym-	Ao, Angami, Sema, Khiamniungan, Chakhesang,	Fat	Rheumatic-joints pain	Fat is used for massaging rheumatic-joints to relieve pain.	Jamir and Lal (2005)

			<i>Lymnonecties linnorcharis</i>	Lotha, Zeliang, Sangtam, Pochury, Konyak and Rengma tribes of Nagaland.				
12	Amphibia	Frog	<i>Rana sp</i>	Irular, Mudugar, Kurumbar tribe of Westren Ghat	Fat	arthritis	Fat is used in massage	Padmanabhan , and Sujana, (2008)
13	Reptile	Common Garden Lizard	<i>Calotes versicolor (Fitzinger, 1826)</i>	Badaga, Kolam Of South India	Fat	Rheumatism		Dixit et al (2010)
14	Reptile	Cobra	<i>Naja naja (Linnaeus, 1758)</i>	Ao, Sema, Khiamniungan, Chakhesang, Lotha, Zeliang, Sangtam, Pochury, Konyak tribes of Nagaland	Fat	Body ache, rheumatic and burn wounds pain	Fat is applied to relieve body ache, rheumatic and burn wounds pain and also for rapid healing of fractured bones	Jamir and Lal (2005)
15	Reptile	Python	Python molurus	Nyishi and Galo tribes Arunachal Pradesh	Fat	Joint pain	Fats are stored in bamboo containers and used in body massage to cure joint pain.	Chakravorty et al.(2011)
16	Reptile	Python	<i>Python reticulatus (Schneider, 1801)</i>	Ao, Angami, Sema, Khiamniungan, Chakhesang, Zeliang, Sangtam, Pochury, Konyak and Rengma tribes of Nagaland. Irular, Mudugar, Kurumbar tribe of Westren Ghat	Fat	Body ache, rheumatic, and burn wounds pain	Fat is applied to relieve body ache, rheumatic, and burn wounds pain.	Jamir and Lal (2005) Padmanabhan , and Sujana, (2008)
17	Reptile	Spiny tailed lizard	<i>Uromastyx hardwickii (Gray, 1827)</i>	Kachchh	Whole body	Joint pain, Rheumatism	The whole animal is boiled in oil and the oil applied externally.	Gupta Leena et al. (2003)
18	Reptile	Monitor	<i>Varanus bengalensis (Daudin, 1758)</i>	Ao Tribe of Nagaland Nandurbar district of Maharashtra, Irular, Mudugar, Kurumbar tribe of Westren Ghat, Todas, Kotas, Badaga, Kolam Of South India, Koya and guthikoya tribe	Fat	Rheumatism, Body pain, Piles,	The fat (oil) of this lizard is used for pain.	Kakati et al. (2006), Patil (2003), Padmanabhan , and Sujana, (2008), Dixit et al (2010), Benargee et. Al (2010)
19	Aves	Hornbill, Pied hornbill	<i>Aceros Nipalensis, Anthacoceros coronatus</i>	Nyishi and Galo tribes Arunachal Pradesh	Fat	Body ache	Stored fats are commonly used for massaging aching body parts.	Chakravorty et al.(2011)
20	Aves	Pied hornbill	<i>Anthacoceros coronatus</i>	Irular, Mudugar, Kurumbar tribe of Westren Ghat	flesh	rheumatic pain	Cooked flesh is eaten in rheumatic pain	Padmanabhan , and Sujana, (2008)

21	Aves	Great Hornbill	<i>Buceros bicornis</i>	Santhal, Kol, Bhumija of orissa	Oil	Rheumatic pains	Oil is heated and applied locally	Mishra et al.(2011)
22	Aves	Crow-pheasant	<i>Centropus sinensis</i> (Stephens, 1815)	Ao, Angami, Sema, Khiamniungan, Chakhesang, Lotha, Zeliang, Sangtam, Pochury, Konyak and Rengma tribes of Nagaland.	Flesh	Bodyache and Rheumatic pain	Flesh is eaten as food to cure bodyache and rheumatic pain.	Jamir and Lal (2005)
23	Aves	Hen	<i>Gallus gallus domesticus</i>	Kachchh	Blood	Body pain Arthritis	Blood is externally massaged on the aching parts of body. Blood is applied externally for healing arthritis	Gupta Leena et al. (2003)
24	Aves	Eagle	<i>Spilornis cheela</i>	Nyishi and Golo tribes Arunachal Pradesh	Fat	body sprains	Oil applied locally	Chakravorty et al.(2011)
25	Reptile	Monitor	<i>Varanus salvator</i> (Laurenti, 1768)	all the Tamilnadu tribes except Toda	flesh	Arthritis,	One kg of the meat along with the skeleton of the monitor is mixed together with 3 liter of coconut milk and boiled for 48 hrs until the meat is completely dissolved. After removing the bones from the medium 50g of ganja leaf (<i>Cannabis sativa</i>) is added to the preparation and boiled until it solidifies.	Solavan et al. (2004)
26	Mammal	Bison	<i>Bison bison</i> (Linnaeus, 1758)	Chhattishgadh	Excreta	Internal injury with severe pain	Excreta are given to patient with water.	Oodhia (2003 b)
27	Mammal	Mithun	<i>Bos gaurus</i> (H. Smith, 1827) Synonym- <i>Bos frontalis</i>	Ao, Angami, Sema, Khiamniungan, Chakhesang, Lotha, Zeliang, Sangtam, Yimchunger, Pochury, and Rengma tribes of Nagaland.	Male organ (Penis)	Breast pain of lactating mother	Male organ is cooked and eaten to relieve severe pain in breast of lactating mother.	Jamir and Lal (2005), Kakati et al. (2006)
28	Mammal	Cow	<i>Bos taurus</i> (Linnaeus, 1758) Synonym- <i>Bos indicus</i>	Mogya, Bawaria, Meena tribe of Rajasthan	Dung + Milk	Muscle pain	Muscle pain can relieve by smear of dung and milk mixture.	Mahawar and Jaroli (2006)
29	Mammal	Buffalo	<i>Bubalus bubalis</i> (B. arnee)	Ao Tribe of Nagaland	Fat	Body pain, Sprain, Rheumatism	Applied externally as embrocation/ massager.	Kakati (2006) Dixit et al (2010)

			(Linnaeus, 1758)	Badaga, Kolam Of South India				
30	Mammal	Camel	<i>Camelus dromedarius</i> (Linnaeus, 1758)	Saharia tribe	Milk	Muscular pain	Used as massage cream in muscular pain.	Mahawar and Jaroli (2007)
31	Mammal	Jackal	<i>Canis aureus</i> (Linnaeus, 1758)	Shoka tribe of Uttaranchal	Flesh	Arthritis	The meat is believed to cure arthritis.	Negi and palyal (2007)
32	Mammal	Jackal (Fox)	<i>Canis aureus</i> (Linnaeus, 1758)	Irular, Mudugar, Kurumbar tribe of Westren Ghat, Koya and guthikoya tribe	Fat	Rheumatism	Fat is used in massage	Padmanabhan, and Sujana, (2008), Benargee et. Al (2010)
33	Mammal	Dog	<i>Canis lupus familiaris</i> (Linnaeus, 1758) Synonym- <i>Canis familiaris</i>	Ao, Angami, Sema, Khamniungan, Chakhesang, Lotha, Zeliang, Sangtam, Pochury, Konyak and Rengma tribes of Nagaland.	Urine	Headache	Urine cures is applied on fore head to relieve headache.	Jamir and Lal (2005)
34	Mammal	Goat	<i>Capra sibirica</i> (Pallas, 1776)	Ao Tribe of Nagaland	Legs	Sprain, Bone fracture	Lower portion of legs cooked.	Kakati et al. (2006)
35	Mammal	Shambhar deer	<i>Cervus unicolor</i>	Irular, Mudugar, Kurumbar tribe of Westren Ghat	Fat	Rheumatism	Fat is used in massage	Padmanabhan, and Sujana, (2008)
36	Mammal	Indian wild ass	<i>Equus hemionus khur</i> (Lesson, 1827)	Kachchh	Blood	Arthritis	Blood is massaged externally for healing arthritis	Gupta Leena et al. (2003)
37	Mammal	Cat	<i>Felis catus</i> (Linnaeus, 1758) Synonym- <i>Felis domesticus</i>	Shoka tribe of Uttaranchal	Whole body	Arthritis	The whole animal is stripped off and boiled and the resultant juice is said to cure arthritis.	Negi and palyal (2007)
38	Mammal	<i>Semnopit hecus entellus</i> (Dufresne, 1797)	Hanuman Monkey	Garasiya tribe of rajasthan	Flesh	rheumatism	Cooked flesh is taken	Jaroli, Mahawar (2010),
39	Mammal	Brown mangoose	<i>Herpestes fuscus fuscus</i>	Irular, Mudugar, Kurumbar tribe of Westren Ghat	meat	Rheumatism and body ache	Meat is eaten to relieved to pain	Padmanabhan, and Sujana, (2008)
40	Mammal	Striped Hyena	<i>Hyaena hyaena</i> (Linnaeus, 1758)	Bhil, Garasia, Kathodia of Rajasthan Kachchh	Fat	Arthritis	Fat is applied externally in massage in arthritis.	Sharma (2002), Gupta Leena et al. (2003)
41	Mammal	Porcupine	<i>Hystrix indica</i> (Kerr, 1792)	Ao, Angami, Sema, Khamniungan, Lotha, Sangtam	Fat	Bodyache, rheumatic pain,	Fat is applied to relieve bodyache, rheumatic pain.	Kakati et al. (2006), Dixit et al (2010)

				and Rengma tribes of Nagaland.				
42	Mammal	Common otter	<i>Lutra lutra</i> (Linnaeus, 1758)	Irular, Mudugar, Kurumbar tribe of Westren Ghat	Secretion from perineal sac	Rheumatism and joint pain	Secretion from perineal sac dry and used	Padmanabhan, and Sujana, (2008)
43	Mammal	Monkey	<i>Macaca mulatta</i> (Zimmerman, 1780)	Shoka tribe of Uttaranchal, <i>Koya and guthikoya</i> tribe	Flesh	Rheumatism,	The meat is believed to cure rheumatism.	Negi and palyal (2007) Benargee et. Al (2010)
44	Mammal	Beer	<i>Melursus ursinus</i>	Irular, Mudugar, Kurumbar tribe of Westren Ghat	Fat	Rheumatism and body ache	Fat is used in massage	Padmanabhan, and Sujana, (2008)
45	mammal	Banded Mongoos e	<i>Mungos mungo</i>	Todas, Kotas, Badaga, Kolam Of South India	meat	Body pain	Meat is eaten to relieved to pain	Dixit et al (2010)
46	Mammal	Rat	<i>Mus musculus</i>	Garasiya trbe of Rajasthan	Soil of mouse's burrow	Arthritis	Soil mixed with mustard oil and paste is topically use.	Jaroli ,Mahawar (2010),
47	Mammal	Clouded leopard	<i>Neofelis nebulosa</i> ,	Irular, Mudugar, Kurumbar tribe of Westren Ghat	Bone marrow	Body pain	Bone marrows are preserved in bamboo cups and used for body massaging	Chakravorty et al.(2011)
48	Mammal	Panther	<i>Panthera pardus</i> (Linnaeus, 1758)	Bhil, Garasia, Kathodia of Rajasthan and Shoka tribe of Uttaranchal Nyishi and Galo tribes Arunachal Pradesh	Fat, bone marrow	Arthritis body pain	Fat is used in massage in arthritis. The fat is used as massaging oil in the treatment of body pain. Bone marrows are preserved in bamboo cups and used for body massaging	Sharma (2002), Negi and palyal (2007) Padmanabhan, and Sujana, (2008), Chakravorty et al.(2011)
49	Mammal	Tiger	<i>Panthera tigris</i> (Linnaeus, 1758)	Ao, Angami, Sema, Khiamniungan, Chakhesang, Lotha, Zeliang, Sangtam, Pochury, Konyak and Rengma tribes of Nagaland.	Fat	Arthritis bodyache and rheumatic pain.	Fat is applied for relieving bodyache and rheumatic pain.	Jamir and Lal (2005), S. K. Sharma (2002), Padmanabhan, and Sujana, (2008)
50	Mammal	Sherni (Tigress)	<i>Panthera tigris</i> (Linnaeus, 1758)	Chhattishgadh	milk	Pain breasts	For external use, they massage it on breasts.	Oodhia (2003 a)
51	Mammal	Toddy cat	<i>Paradoxurus hermaphroditus</i>	Irular, Mudugar, Kurumbar tribe of Westren Ghat	fat	Body pain	Fat is used in massage	Padmanabhan, and Sujana, (2008)
52	Mammal	Indian Wild boar	<i>Sus scrofa cristatus</i>	Bhil, Garasia, Kathodia of Rajasthan, Badaga, Kolam Of South India	Blood	Internal pain	Blood or dry blood powder is mixed with 'mahuri' (local liqure prepare by flower of <i>Madhuca indica</i>) is given to cure internal pain.	Sharma (2002), Dixit et al (2010)

53	Mammal	Indian Wild Boar	<i>Sus scrofa cristatus</i>	Nandurbar district of Maharashtra Badaga, Kolam Of South India	oil	Rheumatic pains	The oil is used for joint (rheumatic) pains.	Patil (2003) Padmanabhan, and Sujana, (2008), Dixit et al (2010)
54	Mammal	Indian Wild Boar	<i>Sus scrofa cristatus</i>	Santhal, Kol, Bhumija of orissa	Teeth	Inflammatory pain	Teeth's are washed in water and is drunk twice a day for seven days.	Mishra et al.(2011)
55	Mammal	Pig	<i>Sus scrofa domestica</i>	Mogya, Bawaria, Meena tribe of Rajasthan Ao Tribe of Nagaland	Fat	Body pain	Fat of pig is use as massage cream in muscular pain.	Mahawar and Jaroli (2006), Kakati et al. (2006), Jaroli (2010),Dixit et al (2010)

Data Analysis

The mammals constitute the highest number of animals used for this medicinal purpose. 26 (51%) mammals, 8 (15%) invertebrates, 6 (12%) birds, 7 (14%) reptiles, 2 (4%) fishes and two (4%) amphibians have been reported for diverse kind of pain in India (Table IV). Of the total 51 animal species reported, 36 (70%) are included in IUCN red data list with 2 endangered, 5 vulnerable, 10 near threatened, 21 least concern category (Table V). 14 (28%) animal species are listed in CITES appendix I, II, and III (Table VI).

Table IV- No. of animal species in different groups reported for medicinal purposes in India.

Name of animal groups	No. of species	% of Total animals
Mammals	26	51
Aves	6	12
Reptiles	7	14
Amphibians	2	4
Pisces	2	4
Invertebrates	8	15
Total	51	

Table V- Conservation status of animal species reported for medicinal purposes in India according to IUCN Red List or Red Data List.

Conservation status	No. of animal species	% of total 51 animal species reported
Endangered	2	4
Vulnerable	5	10
Conservation Dependent	-	-
Near threatened	10	20
Least concern	21	41
Not evaluated	13	25
Total	51	100

Table VI- Conservation status of animal species reported for medicinal purposes in India according to CITES.

Appendix	CITES	% of the total animal used
I	5	10
II	7	14
III	2	4
Not evaluated	37	72
Total	51	100

In this study, we also categorized all the animal body part or products which are use as raw materials for medicinal purposes in following three categories (Table VII).

1) Without injury to animal's life

Excreta, urine, by-products (Honey, milk, mucous, wax, shellac, cocoon, musk, egg) are those raw materials, which are collected without injury to animal's life.

2) Always collected with injury to animal life

Flesh, fat, organs, bile blood, whole body and ash are those raw materials, which are always collected with injury to animal life.

3) With or without injury to animal's life

Some raw material like scale, antler, feather, teeth and bones can be collected with injury to animal life or some time these raw materials can be collected from natural dead animals.

In 10 (18%) medicinal preparations raw materials are collected without injury to animal life (byproducts usage in 7 preparations, excreta usage in 2 preparations and urine usage in 1 preparation). In 2 (4%) medicinal preparations raw materials are collected with or without injury to animal life (scale, antler, feather, teeth are used in 1 preparation and bones are used in 1 preparations). Raw materials are used in 43 (78%) medicinal preparations collected always with injured the animals (flesh in 9 preparations, fat in 23 preparations, organs and bile in 3 preparations, blood in 3 preparations, whole body and ash in 5 preparations). The number of raw materials collected for medicinal preparation with injury to animal's life is very high (Table VIII). Of the total 55 medicinal preparations fat is reported as raw material in 23 medicinal preparations for the treatment of different kind of pain related problems. Mostly fat is uses as raw material in the pain related problems so there can be a relation between animal fat and pain.

Table VII- Raw material collected with or without injury to animals for medicinal usage in India.

Raw material collected	No. of medicinal usage	% of medicinal usage
With injury to animal life	43	78
With or without injury to animal life	2	4
without injury to animal life	10	18
Total	55	100

Table VIII -Animal part or products reported for medicinal purposes in different parts of India.

Disease	Medicinal usage without injury to animal			Medicinal usage with/without injury to animal		Medicinal usage with injury to animals				
	By-products (Honey, milk, mucous, wax, shellac, cocoon, musk, egg)	Excreta	Urine	scale/antler/ Feather/ teeth	Bones / carapace	Flesh/ meat	Fat	Blood	Organs/ bile	Whole body/ ash/ powder
Pain	7	2	1	1	1	9	23	3	3	5

Conclusion-

The housing conditions and difficult working conditions of Indian village, leads to a wide spectrum of pains. People use many kind of alternative medicine for the relief in pain of different kind. With the plants and minerals, people also use animal part or their byproduct for the treatment of diverse kind of pain. In the present study we intensively study those articles which are related to complementary medicinal uses of animals and their part or products in different part of India. After that we have selected 20 research papers for this review and analytical study (Table 1). These papers contain information i.e. English name, scientific name, area or tribe reported, part or product or raw material name and mode of preparation, etc of the animals which are uses as complementary medicine and their related information. However all the authors reported animals are usage for different disease i.e. Antidote, Burn, Eye and Ear, Gastric disorder, Gynecological problems, Impotency, Nervous System, Pains, Respiratory Problem, Skin related Problem, Urinary Problem, Weakness and Wound healing. But majority of them fall into the pain related 20 problems i.e. Body pain, Sprain, Rheumatism, Muscle pain, Headache, Sprain, Bone fracture, Arthritis, Internal Pain etc

After the detailed database, we find 51 animals are reported for the 55 complementary medicinal uses for the pain related problems i.e. Body pain, Sprain, Rheumatism, Muscle pain, Headache, Sprain, Bone fracture, Arthritis, Internal Pain etc. The mammals constitute the highest number of animals used for this medicinal purpose. 26 (51%) mammals, 8 (15%) invertebrates, 6 (12%) birds, 7 (14%) reptiles, 2 (4%) fishes and two (4%) amphibians have been

reported for diverse kind of pain in India. Of the total 51 animal species reported, 36 (70%) are included in IUCN red data list with 2 endangered, 5 vulnerable, 10 near threatened, 21 least concern categories. 14 (28%) animal species are listed in CITES appendix I, II, and III.

In this study, we categorized all the animal body part or products which are usage as raw materials for medicinal purposes in following three categories i.e. Always material collected with injury to animal life, With or without injury to animal's life and Without injury to animal's life. In 10 (18%) medicinal preparations raw materials are collected without injury to animal life (byproducts usage in 7 preparations, excreta usage in 2 preparations and urine usage in 1 preparation). In 2 (4%) medicinal preparations raw materials are collected with or without injury to animal life (scale, antler, feather, teeth are used in 1 preparation and bones are used in 1 preparations). Raw materials are used in 43 (78%) medicinal preparations collected always with injured the animals (flesh in 9 preparations, fat in 23 preparations, organs and bile in 3 preparations, blood in 3 preparations, whole body and ash in 5 preparations). The number of raw materials collected for medicinal preparation with injury to animal's life is very high. Of the total 55 medicinal preparations fat is reported as raw material in 23 medicinal preparations for the treatment of different kind of pain related problems. Mostly fat is uses as raw material in the pain related problems so there can be a relation between animal fat and pain.

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