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A brief study of mammals-a review

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ABSTRACT

Pakistan has a rich variety of animals, including 195 mammalian species. They are important for ecosystem and also play important role as bioindicators. The rapid growth of the human population around the world has a very serious impact on diversity and distribution. Many mammalian species have threats due to anthropogenic impacts; while some mammalian species are moved agriculture, rural and urban habitats for food and shelter. The mammalian diversity is on continuous risk of decline because of increasing population growth rate, converting natural habitat of species into residential areas, resulting in habitat loss. Many mammalian species are used for ethnomedicine and ethno-culture in whole world. These factors are also threats for the mammalian species.

Keywords: Ethnozoology, Biodiversity, Predation, Endemic, Ethnomedicine

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INTRODUCTION

Pakistan has a rich variety of animals, including 195 mammalian species (Roberts, 1997). Many researchers have work on the diversity of the Pakistan (Roberts, 1998; Khan, 2002; Khan *et al.,* 2004; Roberts, 2005) and explained the status of mammals in different cities and provinces of Pakistan (Shafiq *et al.,* 2002; Javed and Azam, 2005; Khan and Siddiqui, 2005; Ghalib *et al*., 2007; Ali *et al.,* 2012). There are five mammalian species in Pakistan which are endemic (Sheikh and Molur, 2004; Gippoliti, 2008; Altaf *et al.,* 2014; Altaf, 2017). These species includes Balochistan Black Bear (*Ursus thibetanus gerardiana*), Indys Dolphin (*Platanista gangetica minor*), Punjab Urial (*Ovis vignei punjabiensis*), Balochistan Dormouse (*Dryomys niethammeri*) and Woolly Flying squirrel (*Eupetaurus cinereus*) (Ali *et al.,* 2012). Many mammalian species have threas (Naveed *et al*., 2014).

HABITAT PREFERENCE OF MAMMALIAN DIVERSITY

Many scientist noted that some mammalian are species for food and shelter moved to agriculture, rural and urban habitats (Stoate *et al.,* 2009; Riem *et al*., 2012; Saito and Koike, 2013; Mahmood *et al*., 2014; Khan *et al*., 2015; Altaf, 2016; Gangadharan *et al.,* 2016). Studies have shown that many variations can be seen depending on the different climatic zones of the world, as the diversity of mammalian species varies from region to region, such as forest-to-city tilt, for example, red foxes of mammalian species are rarely observed in warmer areas of Japanese cities and semi-urban habitats (Uraguchi *et al.,* 2009). In England, this red fox (*Vulpes vulpes*) is very common in colder areas of urban and semi-urban habitats (Harris and Smith, 1987). The consequences of urbanization have been studied in detail in the developed countries of USA, Australia and Europe, but in Asia, this research is exceptional and has now begun to some extent (Dutta *et al.,* 2014). The negative impressions on biodiversity and climate change have shown by the studies on mining effect (Kaur *et al*., 2014). It is expected that there would be increase in biodiversity conflicts and Human wildlife conflict worldwide (Balmford *et al*., 2000; Henle *et al*., 2008; Pettigrew *et al*., 2012; Redpath *et al*., 2013). Posing challenges to protection managers, especially the rapid pace for biodiversity loss (Millennium Ecosystem Assessment, 2005).

ROLE OF MAMMALS

They are important for ecosystem and also play important role as bioindicators (Altaf, 2016; Sidra *et al.,* 2019).

THREATS TO MAMMALS

The high growth of the human species population in whole world has had a very serious impact on diversity. Deforestation, climate change, pollution, habitat loss and invasion of alien species as a consequence of an increase in population indicate the added negative impact (Bierwagen, 2007; Ijaz *et al.,* 2020). Population growth and related effects such as deforestation and habitat loss, the spread of hunting and aliens' species are the underlying causes of almost all recent and declining mammalian species. Threat processes such as these have different strengths on the Earth's surface, and species living in more severely affected areas (Forester and Machlis, 1996; Brashares *et al.,* 2001; Harcourt *et al.,* 2001; Harcourt and Parks, 2003) and have a top level risk of extinction (McKinney, 2001; Ceballos and Ehrlich, 2002).

Large ecosystems have been transformed into debris by expanding new inhabited areas, related facilities, and residential areas that vary greatly due to the natural habitat of the species (McKinney, 2002). Naturally occurring leaves have been replaced (McNeill, 2000). In addition, lots of local species have been changed due to plants with better income or interesting ornamentals (Holway and Suarez, 2006).

The major factors in the turn down of mammalian species and density in Pakistan are urbanization and habitat loss (Altaf *et al.,* 2014). Food shortage, vegetation changes, and pollution are the other included factors (Shochat *et al.,* 2010). Due to this, naturally occurring ecosystems have been transformed into urbanized homes, forests and sub urban landscapes. The diversity of some species increases by providing moderate nesting and finding places for moderate urbanization, to some extent (Blair, 1996). Despite this, in the densely populated areas, the elimination of natural vegetation has reduced the number of biodiversity and thickness reduction (Blair, 2001).

It is also noted that illegal hunting and poaching of the wolves (*Canis lupus*) is the major cause. California has high human being density through the use of riverbank woodlands (Dickson *et al*., 2005). The wild dog (*Lycaon pictus*) found on society land outer the protected area was originate to maintain demand of energy by transferring its diet to the smaller wild prey species rather than livestock (Woodroffe *et al*., 2007). The tiger collects natural resources from forests inside and outside the Chitwan National Park in Nepal by overlaping with a large number of local community of human and collects natural resources from forests inside and outside (Carter *et al.,* 2012).

Natural habitats are being replaced by urban areas, in urbanization, which leads to habitat changes that transform natural ecosystems into urban ecosystems (Morello *et al.,* 2000). In order to understand diversity it is necessary to measure the habitat priority of species (Riem *et al.,* 2012). Among different mammalian species, some species choose to live close to humans, while others tend to live in slightly or completely disturbed habitats (Bateman and Fleming, 2012; Riem *et al.,* 2012).

Due to human influence, mammalian species are highly affected, so some species are based on environmental habits, but some species fail to live or become rare. Anthropogenic impacts cause deforestation (Vale and Vale, 1976; Luniak, 1994) and habitat loss (Czech *et al*., 2000). Urbanization has produced the largest extinction native species (Kowarik, 1995; Marzluff, 2001).

The macro-evolutionary and macro-ecological procedures behind history and recent senerio mammalian biodiversity models are just opening to be discovered worldwide. For example, diversification studies (Isaac *et al.,* 2005) dissipate risk (Cardillo *et al.,* 2005; Schipper *et al*., 2008; Davidson *et al*., 2009), spatial species-rich models (Grenyer *et al*., 2006; Schipper *et al*., 2008), body type evolution (Smith *et al.,* 2010; Cooper and Purvis, 2010) and evolution of life history by Bielby *et al*. (2007) and Sibly and Brown (2007). According to documented study, in the face of the global extinction crisis, it is particularly significant to know these procedures in order to be capable to utilize this information to avoid loss of ecosystem services and future loss of biodiversity (Butchart *et al.,* 2010).

Unfortunately, due to the data deficient, such as world species distribution, evolutionary history, life history and ecology efforts to know diversity of mammals have been vulnerable. Current advances in collating the data for whole

species of mammals means that it is a unique opportunity to discover mammalian biodiversity (Grenyer *et al.,* 2006; Schipper *et al*., 2008; Jones *et al.*, 2009).

Mammals such as herbivores that live in forest landscapes are constantly affecting farmland areas in suburban areas (Studsrød and Wegge, 1995; Madhusudan, 2003). Similarly, wild carnivores and omnivores are also responsible for livestock living in suburban areas. According to records, 24% of corn and 14% of wheat crops per hectare are destroyed every year, so mammals destroy crops at night (Sekhar, 1998). Accordingly, it has been documented that 2% mortality in livestock has been recorded due to the predation by wild species such as lynx, brown bears, leopards and wolves (Din *et al*., 2013). As a result, people are considering killing many predator species that can cause conflicts between humans and wildlife. Agricultural agitation, pollution, fragmentation of large ecosystems, and changes in natural climate patterns are triggered as a result of adverse effects of urbanization which continue to threaten the diversity of mammals. On the other hand, the extinction of many species is due to the use of body parts of many species of mammals in order to make different drugs and illegal hunting of humans. Therefore, considering the above objectives, the plan is planned.

All authors recognize that the real patterns of immigration and extinction must be environmental change, eco-opportunism, and biological interactions (Webb, 1985, 1991; Marshall, 1988). It also points out the possible effects of the alternation between the interglacial and glacial periods (Vrba, 1992, 1993). The unexpected extinction of many mammals and a strong favoritism against larger species, mammalian megafauna was marked at the end of the Pleistocene (Martin and Klein, 1989). The infrequent characteristics of severe extinction lead to controversy about the reason that continued for a century and a half, the timing and severity of this extinction of the species fluctuates from one continent to another (Grayson, 1984). May be this extinction is due to the direct effects of over hunting by human (Martin and Steadman, 1999). On the other hand, all mass extinction events due to environmental changes (Webb, 1985).

MAMMALS AS SOURCE OF ZOONOTIC DISEASES

Many of the infectious ailments can be transferred from fauna to human being (Still, 2003). A best example is primates (Alves *et al.,* 2010). By a recent case the associated risks can be explained from the British Safari Park. Once a monkey is found to have a herpes simplex virus, it will humanely destroy a group of clinically healthy macaques (Swift, 2000). Although the agent is harmless to monkeys, it causes causalities about 80%. Some researchers have seriously considered hypothesis in which there is widespread of HIV in world which is responsible for human AIDS infection may have been caused by monkey-borne virus transmission decades ago (Goudsmit, 1997).

HUMAN-MAMMALIAN CONFLICT

In the past 10,000 years, forest landscapes have been destroyed and turned into agriculture and urban habitats (Bouma and Droogers, 1998). Nevertheless, at the end of the 20th century, agricultural development has begun (Pimentel *et al*., 2004). Because of this, conflicts between natural fauna and the humans have arisen (Henle *et al*., 2008). Although the increasing production of agricultural land and the strengthening of agriculture are becoming necessary conditions, the protection of species is equally important. People and wildlife associations are long and interact in many ways. However, population growth and the need for more resources have led to conflicts between human being as wellas wild animals (Inskip and Zimmermann, 2009; Barua *et al.,* 2013). This is reason, human being and wild fuana have the alike resources, and human beings have destroyed most of natural landscaps of wild fauna (Schwerdtner and Gruber, 2007).

As a result, wildlife reaches urbanized areas, creating and strengthening conflicts between humans and wildlife earlier than livestock (Woodroffe *et al.,* 2005). In result, people have taken special steps to save their livestock and crops from wild species (Bulte and Rondeau, 2005; Ogra, 2008). The conflict between humans and wildlife has led to the extinction of many wild animals (Nyhus and Tilson, 2004). Carnivores mammals are more susceptible to this clash than the omnivores and herbivores due to the large family size (Macdonald and Sillero, 2002). Human and wildlife conflict is a serious issue in worldwide (Dar *et al.,* 2009; Hemson *et al.,* 2009; Inskip and Zimmermann, 2009).

ETHNOMEDICINAL STUDY

In Pakistan, it has been reported for the first time the ethnomedicinal benefits (Altaf *et al*., 2018) and cultural. The study documented that the total of 30 mammals and 28 species of birds are utilized to treat different ailments such as sexual disorders, skin infections and other ailments. The most commonly used body parts are fat, meat, blood, milk and eggs (Altaf *et al.,* 2017). Omega-3 fatty acids in animal fat minerals have been reported to reduce inflammation (Wilson, 2015). Researcher reported in recent studies that residents of the Jhehlum and Lahore used oil and fat to treat colds, breast swelling, headaches, burns, backache, rheumatic pain (Arshad *et al*., 2013), snake bites, skin infections, sexual stimulants (Altaf *et al.,* 2017), neurological disorders, thrombosis, atherosclerosis, thrombosis and aging effects (Breteler, 2000; Haag, 2003).

Lot of fuana have been noted in peri-urban areas for their medicinal uses by Waldram *et al.* (2000), Aikins (2005) and Smitherman *et al.* (2005), whereas some of the species is known about the applications of traditional medicines of urban community animals (Alves and Rosa, 2007; Alves *et al.,* 2007; Arshad *et al.,* 2014). There are lot of fauna which exist in religion music, art, literature, food, medicine and lot of other uses (Kaplan *et al*., 2000; Alves *et al.,* 2012). Zootherapy has made significant contributions to therapeutic practice, magical rituals (Bagde and Hampa, 2013). Zootherapy also establishes an important alternative to modern civilization (Alves and Rosa, 2005). According to study

fauna as well as their products are utilized for the preparation of traditional as well as modern medicines preparations but are also used for traditional medicines (Kang *et al*., 2003). While in plants, the studies of the medicinal use of animals and their products have been unnoticed (Alves and Rosa, 2005).

With more than eight million square kilometers of land in Brazil are rich in culture and biodiversity, and in the context of traditional medicine, it provides countless alternative medicines for the treatment of various diseases. As a result, Brazil has conducted research on ethnozoology, a tendency that has been rising over the past decade (Alves and Souto, 2011). Especially in the Northeast, where animal medicinal properties have become part it, secular practice of traditional communities (Costa-Neto, 1999). Researchers compiled and reported the use of 326 animals, mainly 92 species of fish, 65 species of mammals, 44 species of reptiles and 47 species of birds. It is to be claimed to treat asthma, rheumatism, muscle pain, cancer and male impotence. In a report it is stated that the traditional medicine in Brazil is also closely related to the system of religion and belief, known locally as "simpatias" which means sympathies and animals can be used, for example, for evil eyes or to avoid negative energy (Alves *et al*., 2007). .

Accordingly, the study has been noted about the medicinal use of 283 animals which was reported for the ailments of various diseases in Brazil (Alves *et al.*, 2007). In Bahia, in the northeastern part of Brazil, it has been recorded that more than 180 medicinal fauna have been used in ethnomedicine use (Costa and Neto, 2004). Researcher conducted a review in northeastern Brazil and account for 250 vertebrate and invertebrate species to treat different diseases (Alves, 2009). In Northeast and North Brazil, the vital information recorded 97 fauna for use in traditional ailment (Alves and Rosa, 2007). It has been found twenty animal species that were utilized as ethnomedicine during his survey conducted in selected Israeli markets (Lev and Amar, 2000).

In India, different ethnic people use fauna and their products to cure aliments for human diseases (Jaroli *et al*., 2010). Since ancient times, in Hinduism, people use a variety of products obtained from cattle milk, urine, feces, curds and ghee (Simoons, 1974). Few years back, 24 animals were noted to be utilized for 35 types' medicinal uses, including paralysis, cough, phlegm, asthama and blisters, and for religious uses. There are many available traditional medicines for the treatment which were documented as they found that asthma, cough and other respiratory diseases are the most oftenly cited diseases (Jaroli *et al*., 2010). Various components of the body such as blood, bones, and hair are also used directly or indirectly to treat various disease (Dash and Pandhy, 2007). In India, the researchers identified that there are various animal species used in traditional medical systems during his conduction of an ethnozoological study in Arunachal Pradesh (Solanki and Chutia, 2004). There was conducted a review study identifying 109 species of animals in different parts of India and their 270 utilizes in ethnomedicine (Mahawar and Jaroli, 2008).

In Tanzania, it is noted that more than eighty percent of peri-urban population depends on folk medicine (WHO, 2002). Fauna and their products also have medicinal used as plants (Oudhia, 1995). Forty-two species of animal are utilized

for thirty types medicinal purposes, including sexually transmitted diseases asthma, cough, tuberculosis, bleeding stops, reproductive disorders, weakness, sputum and wounds, and other religious beliefs. So many traditional medicines are available for the cure of ailments as they are utilized for the cure of usually cited ailments such as cough, asthma, tuberculosis and respiratory ailments (Vates and Thomas, 2015).

Approximately 15-20% of Ayurvedic drugs are originating from animals (Unnikrishnan, 1998). Different animal species can also be used for the purpose of relaxing, reducing heartbeat and stroke, and benefiting the body by stroking, observing, petting and working with different animal species (DePrekl, 2002). Moreover, for the purpose of drugs or medicines discovery, the pharmaceutical industry is testing many animal species (Launet, 1993). Ethnomedicinal information collected from indigenous peoples helps identifying new biological resources, primarily for the pharmaceutical industry (Fabricant and Fransworth, 2001).

Furthermore, the development of nano-medicines is based on the folk familiarity of aboriginal people. Therefore according to reported study, the traditional awareness of indigenous people must be recorded, as in recent times the development of modern medicines has been greatly affected due to the loss of the socio-economic and cultural features of local communities around the world (Alves and Rosa, 2005).

In Latin America, the importance of zootherapy is a replacement therapy as the number of medicinal species recorded is very broad and reveals the zootherapy significance. It has been stated that in the area, literature review reveals that at least 584 species of animal, classified in 13 categories, have been utilized in folk medicine. Wild animals are basically used for medicinal fauna which especially includes endangered species in it.In addition to cultural influences, in the practice of zootherapeutic, human social and economic relationships are responsible for the relationship between humans and biodiversity (Alves and Alves, 2011).

The significance of zootherapeutic resources is continuously being led to be underestimated due to the lack of zootherapeutic research in the general world and in Latin America (Alves, 2010; Alves and Rosa, 2010).

The rich biological and cultural diversity of Latin America makes it a special place to observe and enlarge our knowledge of the fauna utilized in ethnomedicine, drawing attention to their importance in public health and protecting traditional knowledge and Biodiversity. According to the study, Latin America is highly regarded for its rich genetic resources and complex cultural diversity (Alves *et al*., 2010; Kent, 2006). Previously documented in Latin America the wild exotic fauna is use for medicinal purpose which shows the presence of an international trade route for medicinal species (CITES, 2002).

Most of the medicinal fauna documented are vertebrates. In Europe, Africa and Asian countries, the species of this group is also oftenly used (Sodeinde and Soewo, 1999; Kang and Phipps, 2003; Kakati *et al*., 2006; Khalid

et al., 2007; Mahawar and Jaroli, 2008; Ashwell and Walston, 2008; Van and Tap, 2008; Quave *et al.*, 2010). Studies have shown that fauna have been utilized in folk medicine, while studies on utilize of fauna in folk medicine are comparatively noval (Almeida, 2007; Martinez, 2008; Souza, 2008).

Most of the animals used as drugs are inborn to Latin America. In order to treat various diseases animal-originated drugs are used. It has been documented that variety of animal species can be used to treat single disease, such as, 95 are used to treat rheumatism and 215 animal species are used to treat asthma (Alves and Alves, 2011).

In Latin America, where most people do not have access to local medicinal fauna, flora knowledge systems as well as allopathic medicines are important. Due to the relatively cheap cost and complexity in accessing current hygiene services, the population utilizes folk medicine. However, the interest and fundamental value of zootherapy is not only due to the lack of modern medical services. The study reported that even due to the more available and developed modern sanitation facilities in cities, many of the people continue to deal with the traditional therapists because of their cultural acceptability of this approach (Alves and Alves, 2011). The significance of local biodiversity become validates due to such findings by providing folk medicines, consistent with previous studies, which show that in any given area the type of zootherapeutic stuff is directly affected by the animal components, accessibility and their availability (Alves and Rosa, 2006; Alves, 2006; Alves and Rosa, 2007; Alves, 2008; Alves and Rosa, 2010). Bones and other organs are utilized in folk medicine due to which several animals have become hunters' favorite target (Alves *et al*., 2010; Alves *et al*., 2008). The study stated that, in fact, rather than use of animal species for their meat or than their so-called medical use, many types of animals are hunted (poaching) (Alves *et al.,* 2010).

In Latin America studies reported by few researchers have shown that native people still do not have access to conventional health facilities, promotion programmes and health prevention, and also demonstrates that the services that present are often culturally unsuitable (Athais, 2004; Sanchez, 2004). In remote areas, many of the people can generally use it as traditional medicine is widely available and reasonably priced. In many developing countries, due to the cheaper and easily accessible approach of the traditional therapies than orthodox medicines, most of the population, especially the people in rural regions, primarily depends on it for initial health care (Alves *et al*., 2007). Traditional medicinal therapy is also more satisfactory because it is easily integrated into people's social and cultural belief systems (Luoga *et al*., 2000; Tabuti, 2003). Therefore, the use of readily available and relatively inexpensive medicinal plants and animals is an important component of this acquired health care (Alves *et al.,* 2007).

Commercialization of medicinal animals is a common phenomenon and is important for its conservation and sustainable use (Alves and Rosa, 2007). Previous authors argue that in developed countries like Asia and the Pacific, such as Taiwan, Australia, the practice of animals medicinal therapies has been

increased, as there is rise in the use of wildlife for traditional medicines which has led to increased by market expansion (Kritsky, 1987; Bloze *et al*., 2008).

Recently different authors proposed the link between folk medicine, fauna as well as human being health; which is carrying consideration to the point that there would also have impacts on human welfare due to loss of biodiversity (Anyinam, 1995; Chivian, 2002; Alves and Rosa, 2007; Alves and Rosa, 2008). One of the study documented that the need for further ethnzoological research that can be used to protect fauna is highlighted by the dependence of communities around the world on the traditional use of animals as food and drugs (Alves *et al*., 2010; Alves and Souto, 2010).

CONSERVATION OF DIVERSITY

There is an urgent necessity to protect twelve percent of the world's threatened birds, twenty five percent of mammals, forty percent of amphibians and twenty percent of invertebrates as the diversity model is complex preocess to map and oberve in whole earth (Vié *et al*., 2009). Fauna extinction will continue to rise (McKee *et al*., 2004). While protecting species, information on habitat variables that may affect species diversity is not considered and in addition to direct biodiversity monitoring (MacArthur and MacArthur, 1961; Cody, 1981; August, 1983; Pidgeon *et al*., 2001). Humans play a vital role in protecting species because humans are almost in various ecosystems and as it cannot be refused (Henle *et al*., 2008).

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