Research Article

Management Practices and Economic Analysis of Camel in District Khairpur Mir's, Sindh

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Abstract | The present study was conducted to analyze the management practices and economic importance of the camels at district Khairpur Mir's, Sindh during the year of 2017. A total of sixty camel herders were selected during the survey and interviewed using comprehensive Questionnaire. Survey indicated that the Sakrai breed is prominent in number followed by Dhatti, Larri/Sindhi. Camel herders were almost uneducated except small proportions that were primary passed. Among the land holders, each sedentary and household camel herders possessed 1 to 5 acres land where they grew Rabbi and Kharif crops. The production systems were 45% of sedentary, 26.6% transhumant, 18.3% nomadic and 10% house hold. The age of 60% camel herders were found between 25 to 50 years, 28.33% between 50 to 60, 8.33% above 60 while 3.33% below 25 years. Incidence of protozoa were more common at study area. The age of puberty and breeding life were 3-5 and 12-22 years respectively in females. Duration of estrus cycle in camel varied from 16-22 days. Average hair production of 1.63, 1.62, 1.47 and 1.36 kg was noted for Kharai, Dhatti, Larri and Sakrai breeds respectively. Average daily milk production of Dhatti, Sakrai, Kharai and Larri camels were recorded as 6.40, 5.23, 4.90 and 5.20 liters respectively while the lactation yield was found 1529.30, 1455, 1442 and 1511 liters respectively. The Kharai camels possessed capability of carrying high load (553kg) followed by Larri/Sindhi 515 kg. Study concludes that the camel are reared by using old traditional methods. The modern farming does not exit and extension services are rarely available to motivate and educate the camel herders. Higher load carrying capacity, hair production and body weight was observed in Kharai breed, however; milk production and lactation length was better in Dhatti breed.

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Introduction

The livestock is one of the largest component of agriculture sector (Andrieu, 2008), it possess a good position, because its influence stood at 58.55 percent into the agriculture sector, however 11.61 percent into the gross domestic production of Pakistan (Economic Survey of Pakistan, 2016-17). In addition to cattle, buffalo, goat and sheep, camel is also a very important species of livestock though play vital role in rural economy of local farmers. The important pre-requisition for the efficient camel production is to

optimize the good performance for the economic and management practices (Asim et al., 2013). Generally, the camel belongs to family *Camelidae*, sub order *Tylopoda* (pad footed) and order *Artiodactyla*. There are two genera of family *Camelidae* viz *Camelus* and *lama*. The first genus of *Camelus* possess two species like *Camelus dromedaries* that mostly found in dry hot arid land of Australia, Asia and Africa while the *Camelus bactrianus* though found in cold arid land of central Palearctic Ecozone (Anonymous, 2008-2009). It has been reported that approx. 85% of dromedary camel population inhabits in the Eastern and Northern Africa while remaining into the Indian sub-continent and Middle East, whereas the small population of double humped camels are found in central Asia. The camel is only a single versatile animal whose name is mentioned in the Holy Quran that is a miracle of the Almighty Allah. This animal is multipurpose animal and can tolerate a very harsh and hot atmosphere therefore it is also called as ship of the desert (Deurasech, 2005).

There are three major production systems of camel in Pakistan i.e. sedentary, transhumant and nomadic. These production systems are mostly examined by the environmental condition, land consistency, vegetation resources and availability of water. Extensive husbandry of the camels is generally characterized in the nomadic system (Mehari et al., 2007). In the nomadic system milking is not regularly organized as collection is usually based on need of utilization. In semi-intensive system two times milking is practiced and expert laborers are hired for the husbandry practices and regular milking of the camels (Babiker and El Zubeir, 2014). In transhumant system due to fluctuating environment, herd migration remains primary strategy for survival. Types of movements may be seasonal, short distance and long distant disaster migration. The she camel of good health and having a proper nutrition may produce 15-20 liters milk per day (Younas and Iqbal, 2001).

Furthermore, it has been reported that the camel has a unique ability to survive for a very longer period without drinking and replenish that loss in a short time as compared to other livestock animals (Farah et al., 2004). Reports regarding camel production indicate that the she-camel milk production generally ranges from 900-4100 liters in a single lactation period (250-500 days). Additionally, a single mature camel can produced 1-3 kg hairs annually that may be used for making mats, ropes, carpets, bags, blankets. Hide of this animal is mainly used for shoes and saddles formation (Khan et al., 2003). While working on socio-economic importance of camel described as an animal of great importance in large tracts of the industrializing world, where it serves as a cheap source of power for drawing water from wells, ploughing, leveling of land, working mini mills for oil extraction (from oil seeds), grinding wheat, corn and other grains, crushing Sugarcane and pulling carts for the transportation of goods as well as people (Nagy and Juhasz, 2010). Camels are also engaged in the transport of salt, fuel wood, agricultural produce and household goods (Younas and Iqbal, 2001). In addition, a baggage camel comfortably carries loads up to 300 Kg to distant places at a rate of 30 Km/day. These facts tend to suggest that the camel can be of immense help to improve the livelihoods of those who rear it (Raziq, 2009). No doubt the camel plays a vital role in the rural economy of camel herder but unfortunately the production potential of the camel has been given much lesser attention. In these regards although some studies have already been conduct in Pakistan (Isani and Baluch, 2000) but in Sindh Province a very limited documentation has been reported, in fact district Khairpur Mir's has never been studied in such regards. The current study was therefore designed to evaluate the management practices and economic analysis of camel in Sindh province particularly at district Khairpur Mir's.

Materials and Methods

The present study was conducted to collect the information regarding management practices and economic analysis of the camel by the camel farmers in district Khairpur Mir's of Sindh Province during the year of 2017. The selection of camel farmers from each village was based upon the herd population and experience of camel herding. The general information viz., silent features of the targeted areas, general profile of camel herder, features of camel herding, the features of camel herding were further studied and analyzed in the aspect of production system. A total of sixty (60) camel farmers were selected in the field survey. A comprehensive Questionnaire was setup and pretested to obtain the accurate and reliable data. The data were collected regarding different aspects of study such as geographic location, climate, soil and water resources, vegetation, age of the herders, famers educational level, breeds of camel, farm experience of

the herders, production system, camel diseases, land holding, herd composition, feeding practices, breeding practices, milk production, hair production, draught ability and camel marketing. As the data on different parameters during field survey was exploratory and descriptive in nature, therefore the collected data were compiled, tabulated and analyzed by using simple statistical tools such as frequency and percentage.

Statistical analysis

The collected data were analyzed using statistical software (Statistix Version 8.1). Descriptive statistics were applied and means expressed in terms of frequency and percentages for each variable.

Results and Discussion

Breeds of camel

There were four camel breeds found in district Khairpur Mir's i.e Dhatti or Thari, Sakrai, Kharai, Larri or Sindhi. It was examined that the Sakrai breed was present in large number followed by Dhatti, Larri/ Sindhi and Kharai breeds. They were reared under intensive, semi-intensive and extensive management practices in district Khairpur Mir's (Figure 1).

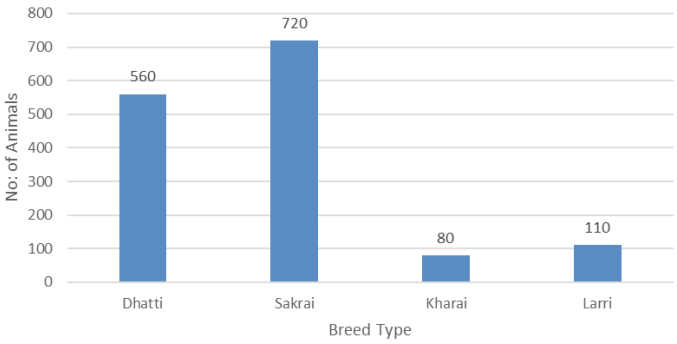

Figure 1: *Camel breeds in district Khairpur Mir's.*

Educational level of camel herders

Regarding educational level of camel herder results are presented in the Figure 2. The results show that majority of the camel herders were un-educated (60%) while some possessed primary level of education (30%) together with the few herders having a secondary level of education (10%). Economically it was observed that camel herders having secondary level education get more profit from primary as well as un-educated herders due to better management and production system i.e. Sedentary and Household.

Land holding of camel herders

The result summarized in Figure 3 indicates that the majority of camel herders were land less. It was noted from the study that (55%) of camel farmers were land less (26.6%) having below 5 acres land (11.6%) would have 5 acres land and rest of (6.6%) possessed above 5 acres land. Economically it was examined that herders which possess above 5 acres land get more profit from below 5 acres and landless herders. Among land holders the household and sedentary owner of camel possessed own piece of land i.e. (1 to 5 acres). They cultivated that piece of land to feed their camels.

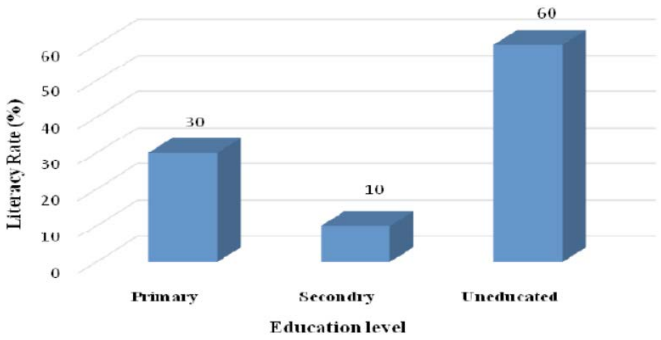

Figure 2: *Educational level of the camel herders in District Khairpur Mir's.*

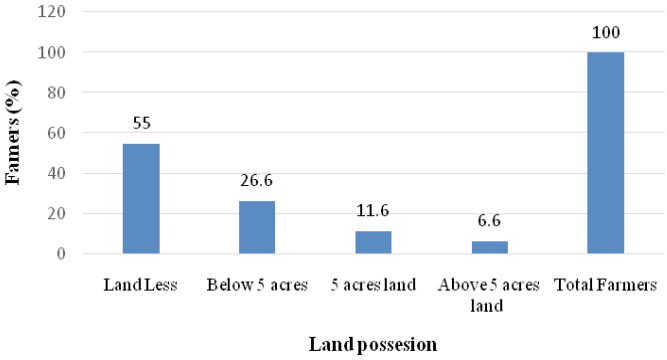

Figure 3: *Land holding of the camel herders in District Khairpur.*

Production system of camel herding

The results shown in Figure 4 reveal that generally camels were reared under Sedentary, Transhumant, Nomadic and House hold production systems in district Khairpur Mir's. Sedentary system was found more common (45%) followed by transhumant (26.6%), nomadic (18.3%) and house hold (10%). Additionally, the Household and Sedentary production systems were more economic compared to Nomadic and Transhumant.

Age composition of camel herders

The socio-economic situation of camel herders was examined that the majority of the camel herders age was between 25 to 50 years. It was noted that the (60%) of camel farmers fall in this category *i.e.* (25 to 50) years, (28.33%) in (50 to 60) years, (8.33%)

were above the (60 years) and only (3.33%) below 25 years, which was mentioned in Figure 5 respectively. Economically it was examined that the herders though possess the age between 25 and 50 years get more profit followed by 50 and 60 years because they were young energetic and possess sufficient experience to manage their camels (Figure 5).

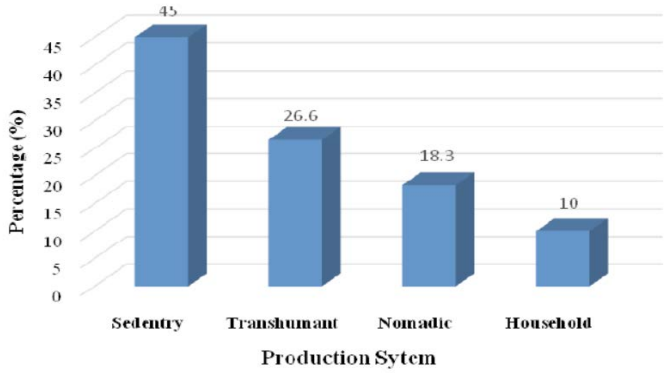

Figure 4: *Production System of Camel Herding in District Khairpur.*

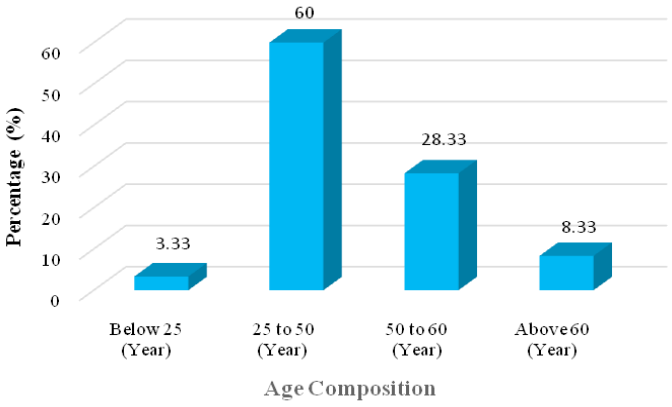

Figure 5: *Age Composition of Camel herders in district Khairpur Mir's.*

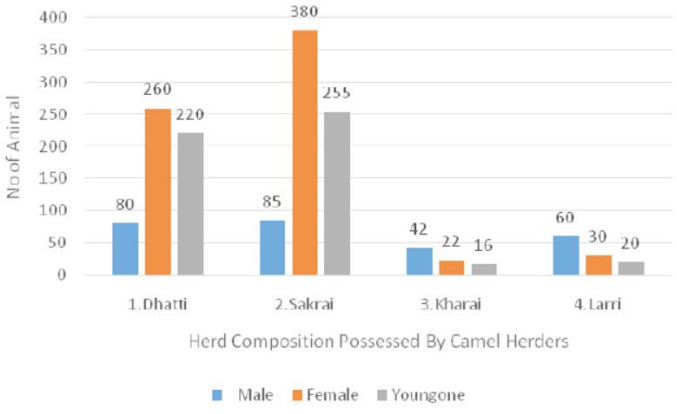

Figure 6: *Herd Composition of Camel possessed by camel herders in district Khairpur Mir's.*

Herd composition of camel possessed by various camel herders

The results shown in Figure 6 depict that the herd composition included different camel breeds viz Dhatti, Sakrai, Larri and Kharai. Female ratio markedly increased from male and young ones, because the females were generally utilized to fulfill the basic requirements of their households i.e milk, cheese, curd and ropes. However, the male camel of Larri and Kharai were mostly (74%) used to carry the luggage, carrying load, pulling cart and crushing sugar cane, while the young one were sold at the time of emergency for their financial support.

Camel diseases

The results in the Figure 7 reveal that the different diseases in camel breeds including parasitic, infectious and plant intoxication were examined through interview of different camel herders and their local veterinary practitioner by the pretested questionnaire where the prevalence of infectious diseases was (46.66%) increased from the rest of the diseases like parasitic (41.68%) and plant intoxication (11.66%).

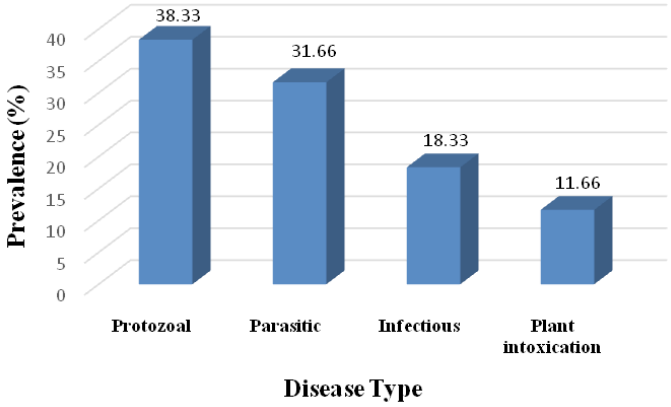

Figure 7: *Camel diseases in district Khairpur Mir's.*

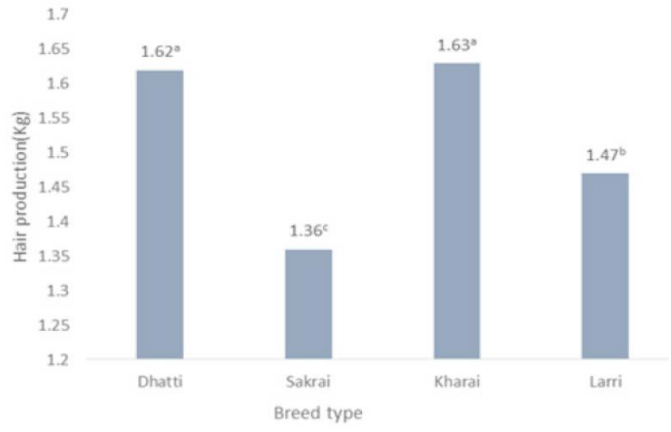

Figure 8: *The Hair production (kg) of different camel breeds in district Khairpur Mir's; SE+0.0359; LSD (0.05) 0.0712.*

Hair production

The results presented in the Figure 8 regarding the hair production of different camel breeds show that the mature camel were found to produce hair from 1

to 2 kg per year. The Kharai breed of camel produces slightly more hair production from rest three breeds. Kharai camels were found to produce 1.63 kg hair followed by Dhatti (1.62), Larri (1.47) and Sakrai (1.36) respectively. Regarding hair production the Kharai camels were more economical from Dhatti, Sakrai and Larri camels. Moreover, it was examined that in semi-intensive management practices the camel produce more hair compared extensive system due to better feeding and selective bull for breeding practices.

Interactive hair production of different camel breeds

Figure 9 shows the results regarding interactive hair production of different camel breeds. The averaged hair production of Kharai female was observed highest (1.81 kg) followed by Dhatti female (1.79 kg), while the lowest hair production was noted in sakrai male (1.28 kg). Regarding interactive hair production the female of Kharai camel were more economic followed by female of Dhatti camel.

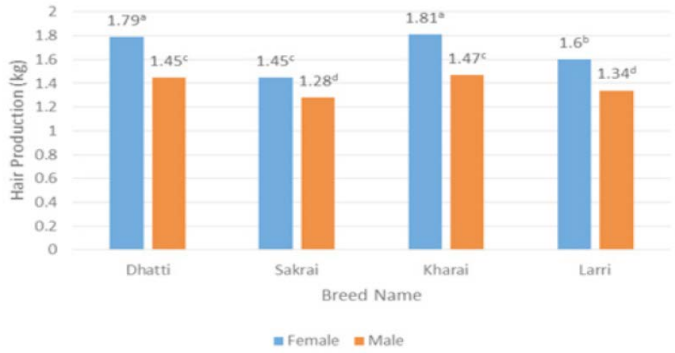

Figure 9: *Interactive hair production of different camel breeds; SE+0.0359; LSD (0.05) 0.0712*

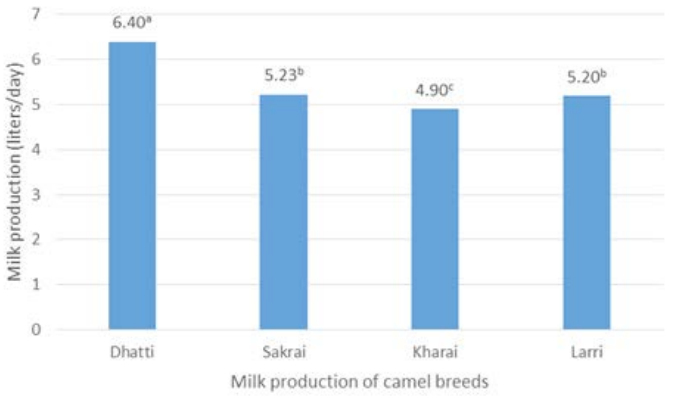

Figure 10: *Productive performance of different camel milk/day in district Khairpur Mir's; SE+0.1510; LSD (0.05) 0.2992*

Productive performance of camel (Milk production/day)

The results shown in Figure 10 regarding the daily milk yield of different camel breeds indicate that average daily milk production of Dhatti, Sakrai, Kharai and Larri camels were recorded 6.40, 5.23, 4.90 and 5.20 liters respectively. Results further depict that milk production of Dhatti camel was more economical compared to other breeds. In semi-intensive management practices the camels produced more milk in comparison with extensive practices.

Productive performance of camel (Milk production/lactation)

The results revealed in Figure 11 regarding lactation yield of different camel breeds were recorded, where the maximum lactation yield of Dhatti camel 1529.30 L, followed by Larri camel 1511 L was observed respectively. Economically the female of Dhatti camel was found more profitable than other breeds.

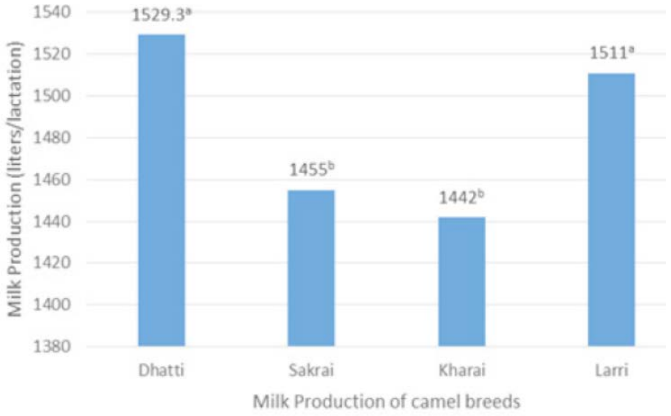

Figure 11: *Productive performance of different camel milk /lactation in district Khairpur Mir's; SE + 25.822; LSD (0.05) 51.164*

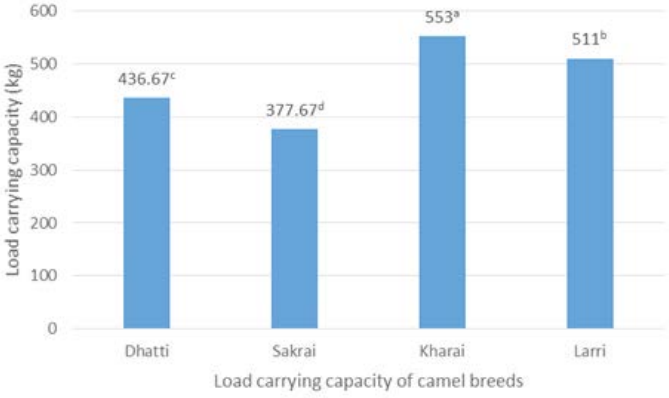

Figure 12: *Load carrying capacity of different camel breeds in district Khairpur Mir's; SE+10.974; LSD (0.05) 21.744*

Load carrying capacity of different camel breeds

The average load carrying capacity of different camel breeds were varying from each other's. Dhatti, Sakrai, Kharai and Larri camel breeds were noted as 436.67, 377.67, 553 and 511 kg respectively. Economically the Kharai camel was found more profitable followed by Larri, Dhatti and Sakrai breeds. According to

statistical analysis the Kharai camels were observed to possess highest loading carrying capacity (553kg) followed by Larri/Sindhi camel (511kg) (Figure 12).

It was examined that the Sakrai breed was present in large number followed by Dhatti, Larri/Sindhi and Kharai breeds in district Khairpur Mir's. The findings are analogous with the study of (Khosa, 2017) whose results showed that the majority of the camel owners reared Jathnasal breed (Raidy) camel (62.60%) followed by Kohi (26.59%) and Mari camel breed (10.82%). In Pakistan, two kinds of breeds i.e. Riverine and Mountain camels were found (Khan et al., 2003). Earlier studies on Isani and Baluch (2000) and Younas and Iqbal (2001) described that overall twenty breeds of camel were found in all four province of Pakistan, amongst 4 breeds (Sakrai, Sindhi or Larri, Kharai, Dhatti) were widely distributed in Sindh, 7 breeds (Rodbari, Pishin, Lassi, Makrani, Brahvi, Kharani and Kachhi) in Baluchistan, 5 breeds (Kalachitta, Campbelpuri or Mountainous, Mareecha or Mahra, Brella or Thalochi and Bagri or Booja) in Punjab and 4 breeds (Maya, Gaddi, Khader and Ghulmani) in Khyber Pakhtunkhaw. The majority of camel herders' age were between 25 to 50 years old, it was also noted that 60 percent of camel farmers fall in this category i.e. (25 to 50) years, 28.33% in (50 to 60) years, 8.33% were above the (60 years) and only 3.33% in below 25 years respectively. These results are matching with the study of Mansour et al. (2016) who reported that more than half (72%) camel herders were 27-50 years old. These results are also parallel with the Abdalatif et al. (2013). They stated that 20.62% camel were in the age group of less than 25 years, 15.36% in the age group of 25-30 years, 17.52% in the group of 30-40 years and 46.47% in the age group of more than 40 years respectively.

The female ratio markedly increased than other male and young ones because the females were generally needed to fulfill the basic requirements of their households in term of milk, curd, cheese and rope etc. However, the males of Larri and Kharai breeds were mostly used to carry the luggage, carrying load pulling cart and crushing sugar cane. The young ones were sold at the emergency time for their financial support. These results are matching with the findings of Abdalatif et al. (2013) where camels herd composition was focused in their study. The females represent 73.3% and the male represents 26.7%. Similarly, Ishag and Ahmed (2013) reported that the herd composition in a 70 head of herd size of camels contained 10.6% male calves and 9.4% female calves, immature male camels were up to 5.9%, immature female 17.6%, mature male camels were 9.45%, and mature females were 47.1%. Keskes et al. (2013) reported that 54.87% were the female camels in Dhatti and Sakrai breeds while Larri and Kharai camel was dominated by the male camels in the herd composition because they were best load carrying camel breeds in the study area.

The different diseases in camel breeds including infectious (46.66%), parasitic (41.68%) and plant intoxication (11.66%) were observed where the incidence of infectious diseases was markedly higher than the rest of the diseases. These results are in contrast with the study of Mansour et al. (2016) who reported (61.7%) infectious, followed by (27.5%) plant intoxication and (10.8%) parasitic disease. This contradiction regarding the disease prevalence may be due to geographic location, breed variation and climatic conditions. Similar reports presented by Worboys et al. (2010) in their study. Findings of the study also agree with Khanvilker et al., 2009; Mayouf et al., 2014; Simenew et al., 2013; Tura et al., 2010; Abdel Rahim, 1997. Furthermore, Kharai camel produced 1.63 kg hair production followed by Dhatti (1.62kg) and Larri (1.47kg) and Sakrai breed (1.36kg). Similar findings were reported by (Khan et al., 2003) who stated that almost 92% of the respondents replied that the single camel can produced 1-3 kg of hair production per year. The hair production of mature camel could be varied due to the climatic conditions, vegetation and breed of camel. The Kharai camel was observed highest loading carrying capacity (553kg) followed by Larri/Sindhi (515 kg). The results of current study are in contrast with the findings of (Khan et al., 2003) who reported that the load carrying capacity of camel was 300kg. The difference in load carrying capacity may be linked with the camel breeds, health condition of animal and consistency of land surface at respective area.

The daily milk production of Dhatti, Sakrai, Kharai and Larri camels were recorded as 6.40, 5.23, 4.90 and 5.20 liters respectively with average lactation yield 1529.30, 1455, 1442 and 1511 liters respectively. These findings are in contrast with (Khosa, 2017) where the daily milk yield was reported by 35 camel herd owners in the surveyed areas of Jafferabad district of Baluchistan. Lactation yield was in the

minimum and maximum range of 2254-5644 liters for Jathnasal (Raidi camel), 1600-4007 litres for Kohi and 1488-3725 litres for Mari camel breed. This variation may be due to breed difference, feed type and grazing pattern or management practices i.e. intensive, semi-intensive and extensive. The average milk yield in litres per day of Afar camel from the beginning to the end of lactation was 7.62±2.53 and 3.00±1.29 litters, respectively. Simenew et al. (2013) and Mehari et al. (2007) reported the average daily milk yield 3.49±0.89 litres. Kamoun and Jemmali (2012) survey results showed that the average milk yield and peak milk yield of camel varied significantly region to region. These findings are in agreement with present study.

Conclusions and Recommendations

Present study concludes that the camel are mostly reared using old traditional methods. Modern farming rarely exists and extension services are poorly available to motivate and educate the camel herders about the modern technologies. Market infrastructure is also poorly established whereby middlemen get more benefit from camel herders due to lack of marketing facilities. Higher load carrying capacity, hair production and body weight was observed in Kharai breed, however; milk production and lactation length was better in Dhatti breed.

Author's Contribution

Turab Ali Kaurejo: Collected data and entered the data in SPSS for analysis.
Humaz Rizwana: Conceived the idea.
Gulbahar Khaskheli: Provided technical input at every step.
Mummmad Naeem Rajput: Did SPSS analysis.
Muhammad Haroon Baloch: Contributed in overall management of the article.
Asad Ali Khaskheli: Wrote abstract, introduction, methodology, results and discussion and conclusion.
Mohsin Solangi: Contributed in the references.

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