

Review on Health and Welfare of Working Donkeys

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Abstract: Donkey is one of the most important drought animals that is playing a key role in the agriculture economy. Ethiopia is a country with the highest donkey population in the world (6.5 million). Despite their high population and prominent role in Ethiopia agriculture, much has not been done to study the physiology, nutritional requirement, health problems and management requirement. As the welfare of animals, they need to be protected to live peacefully in their environment without affecting their health and welfare. Due to the minimum attention given to the donkeys, particularly in countries like Ethiopia they are prone to a number of diseases including multi-parasitism, back sore and other wounds due to different causes, hoof problems, lameness, colic and various infectious diseases. The welfare problem of the donkeys is mainly due to bad management practices and health problems. The possible solution to improve the welfare of donkeys is by creating awareness to the community with proper veterinary health care and designing diseases prevention strategies.

Key words: Equine • Lameness • Management • Pack Animal • Welfare • Wound

INTRODUCTION

The donkey are being used by man as a draught animal since domestication but, few attempts have been made to study aspects of this animal particularly in countries where they are most important [1]. Global distribution of donkeys shows 98% of them to be found in developing countries. Of which 11.6 million are found in Africa [2]. Ethiopia have 5.2 million donkeys stands the first country in donkey population in the world and possesses nearly 40% of Africa donkey population. According to the present regional classification, 97% of donkeys are found in three regions, 44% in Oromia, 34% in Amhara and 19% in Tigray regional states [1].

Donkeys are still one of the most important drought animals playing a key role in the agriculture economy. Donkeys are considered better than other draft animal because of their inherent tolerant for dehydration, low sweating rate and good thermo-ability. Recurrent drought in Ethiopia resulted in increased cattle mortality and increased donkey usage as a draft and pack animal in both rural and urban areas. They account for over 50% of animal energy scenario in the country. Donkey is more adapted to the Ethiopia terrain than either the mule or the horse [3].

Despite their high population and prominent role in Ethiopia agriculture, much has not been done to study the physiology, nutritional requirement, health problems and management requirement. Donkey in Ethiopia at least in the donkey health and welfare project (DHWP) operation sites are subjected to variety of health disorder including multi parasite, back sore and other wounds, hoof problems, colic and various infectious diseases such as strangle, tetanus, Africa horse sickness (AHS) and others [4].

As the welfare of animals, they need to be protected to live peacefully in their environment without affecting their health and welfare. They must not be neglected to have access for feed, water and shelter or abused by beating and harming and deprived of freedom of movement and exercise [5]. Therefore the objective of this paper is to review on welfare, uses, distribution and constrain of donkey and to deal with health problem of donkey such as lameness, wound and diseases.

Welfare Definitions: According to World Veterinary Association (WVA), animal welfare is a scientific discipline which incorporates “applied aspects of ethologic, bioethics and the concepts of suffering and wellbeing” [6]. In simple term, welfare can be defined as

'well-being' and the accepted definition of welfare is that of 'Five Freedom' which are freedom from hunger and thirst by providing ready access to fresh water and diet to maintain full health and vigour; freedom from discomfort by providing an appropriate environment; freedom from pain, injury or disease by prevention or rapid diagnosis and treatment; freedom to express normal behaviour by providing sufficient space, proper facility and company and also freedom from fear and distress by avoiding mental suffering. The health and welfare of an animal is determined by its physical and mental state, including physical fitness of the animal [7].

Uses of Donkey: Donkeys used as pack or cart animals have enabled small-scale farmers to participate in the market economy by transporting people and agricultural products to and from the market [8]. In developing nations, the majority of working animals are owned by individuals who use them as their sole means of generating income. Millions of poor people depend on equines for their livelihoods.

In addition to their traditional role as pack and riding animals, equines, most notably donkeys as they are cheaper than oxen and more resistant to droughts and increasingly used for light cultivation tasks. In the developing world, they are the most important source of agricultural energy and transport for resource-poor communities in both urban and rural areas [9]. They are the key means of transportation in poor nation in less infrastructure areas by which in agriculture and food distribution systems. Equines transport enables small farmers to establish wider contacts with traders, improving access to markets and allowing them to increase production and profits. Donkeys play a significant role in helping to empower women in many developing nations [8].

As united nation (UN) predicted that the population of Least Developed Countries will double from 804 million to 1.7 billion by 2050. Thus, the use of working equines, particularly donkeys in developing countries will be increasing [11].

Donkeys as a Means of Livelihoods: A donkey is a valuable asset because it extends a household's economic options in every sense. Maintaining the health and welfare of donkeys is paramount to the displaced and none displaced alike. During the 1983-85 famine, Darfuris chose to go hungry, eat wild foods and cut back on market purchases of cereals in order to spend most of their scarce money on their animals, to protect a donkey is to protect a livelihood [12].

Ethiopia has the largest livestock population in Africa, accounting for over 40 % of the gross domestic product (GDP). Whether as pack animals or in pulling carts, animals are preferred and dominate the transport services sector. The choice of animals and systems of use in particular areas for transport is mainly based on socio-economic and environmental factors. In Ethiopia, there are over 5.2 million donkeys and they are increasingly becoming a means of livelihood, playing a crucial role in transport services in peri-urban households. Unfortunately, ownership utilization and management of donkeys is of very low level in most resource-poor areas [6].

Study conducted in South Nation and Nationalities of Ethiopia by the Brooke in the contribution of donkeys, horses and mules to people's livelihood indicated that the economic and social contribution of equines to the livelihoods of societies, especially the poor, in terms of creation of employment opportunities, access to finance and local transportation are enormous. The net returns from equine use are significantly higher than the total costs, showing equines in the small holder communities are very useful whether it is for exclusive own use or for income generation. Donkey assists poor households with income-generating opportunities and has contributed in improving access to finance. Spending by households of cash income from the rating out of equines and gharry and cart services on other rural services such as crop or livestock agriculture offers realistic ways of obtaining returns from agriculture above mere subsistence agriculture, which is highly susceptible to climatic risk, diversification into non-farm activities could be the most appropriate solution [13].

Use of Donkey as Pack Animals: The use of donkeys for transport in Africa dates back to historic times. This is in contrast to the situation in many African farming systems where farmers have only recently started to use donkeys because of changes in land-use patterns, agro-ecological conditions and labor availability. Packing is one of the most ancient forms of transport that preceded even the invention of the wheel. That it has survived to the present day emphasizes its value. The uses of donkeys as pack animals or for pulling a cart have enabled small-scale farmers to participate in the market economy. Donkeys have reduced the domestic transport burden of rural women and have created employment and income-generating opportunities for many people [3].

The Maasai community in Kenya uses donkeys for fetching water, for household shifting (during migration), for carrying the sick to hospital, for carrying sick calves,

for transporting shopping and for pulling fencing materials needed for constructing biomass. In Botswana, donkeys are used for transporting people and goods, for transporting sand for building houses and for fetching water and firewood. In the remoter, mountainous areas of Lesotho donkeys are important for transporting grain to the mills. In Ethiopia, donkeys are a major mode of transport. They transport at least 12 different commodities including food to remote areas during war and peace as well as guns and ammunition during war. Some rural Ethiopians recall that in famines of the past they only survived by someone bringing in food on donkeys. Donkeys are also used in densely populated city areas. In Egypt they are used by the farmers and rubbish collectors in Cairo and other cities [14].

Donkey transport is also used in agricultural production, mainly to transport manure to the fields and to harvest from the fields to the homestead and to the market. These transport functions are becoming critical as land is more intensively cultivated and families begin to depend on income from marketing cash crops. In most countries, the governments are dismantling state marketing systems and the onus is on the producer to reach the market. An availability of transport options enables small producers to jump a step or two in the marketing chain and therefore retain a larger proportion of the profits [8].

Donkeys are kept in Africa for four reasons: work, breeding, milking and eating. Of these, work is most important and used mainly as pack animals, either for carrying loads or for riding. In arid regions they are used together with camels to pull water from deep wells. Less commonly they are used in traction, for example, pulling carts or plows, although both of these technologies are post-European introductions in sub-Saharan Africa [15].

In Ethiopia, animal traction contributes significantly in supporting both rural and urban livelihoods. Draught animals provide smallholder farmers and transport operators with vital power for agricultural and transport work and is a major player in peri-urban economies [16].

Donkeys are important sources of income for many families. In many parts of the country there are people who earn their entire living from cutting wood, collecting cattle dung or eucalypts leaves and transporting the product on pack donkeys for sell in the urban center. Donkeys and mules also transport salts from the mines in Brehale to Mekele in Tigray. The donkeys contribute the income of the salt traders as well as to government revenue in the form of an excise tax. The rift valley donkey-drawn carts are rented out for ten birr per day which help farmer to diversify their income [17].

Distribution of Donkey: Ethiopia is a country with a highest donkey population in the world that is estimated to be 6.5 million. The majority of the donkeys are found in the high land parts of Ethiopia that densely populated in three regions, Oromia(44%), Amahara (34%), Tigray (19%). About 85% of farmers in the high land of Shewa own donkeys, with an average of 2.7 per households. In Tigray 49% of farmers keep donkey with an average number of 1.5 per family. In Dire Dawa and East Oromia, 70% of small holders keep one donkey per family. Female donkeys are the most numerous it is about 70 %. In Addis Ababa the capital city of Ethiopia as many as 3000 donkeys are found. Particularly in Merkato grain market transporters generally own between two and five donkeys each transports about 100kgs [18].

Working Donkeys' Welfare Assessment: Due to minimum attention given to donkeys, particularly in countries like Ethiopia they are prone to a numbers of diseases. Donkeys in Ethiopia are subjected to a variety of health disorder including multi-parasitism, back sore and other wounds due to different causes, hoof problems, colic, various infectious diseases such as strangles, tetanus and others [4]. Wounds have been considered as a second most important health problem next to multi-parasitism. One of the major problems which are a potential threat to the lives of working donkeys in central Ethiopia is hyena bite [19]. In addition, these animals work under difficult environmental conditions including intense heat, difficult terrain and often in appropriate equipment, with inadequate food and water, resulting in exhaustion, dehydration, malnutrition, lesions and hoof problems. The prevalence's of welfare problems in horses, mules and donkeys working in five developing countries have been described in a large-scale study. In Ethiopia only few owners have access to veterinary advice or treatment. As a result, many owners rely on traditional medicines and treatments which are often inappropriate and cause welfare problem on the equine themselves [20].

Constrains of Donkey Welfare: In Ethiopia only few owners have access to veterinary advice or treatment. As a result, many owners rely on traditional medicines and treatments which are often inappropriate and cause welfare problem on the equine themselves; for example, 'firing', which involves causing burns to the skin with hot irons or corrosive substances in a mistaken belief that this will cure underlying problems [20].

Shoeing practices are important to the welfare of donkeys. However, high percentages of hoof/shoeing abnormalities are seen in developing countries where

there is poor quality of service and low skill levels of the farriers due to a lack of farriery training courses in many developing countries [20]. Donkeys are sociable and social activity is important to them but, working under the difficult conditions described above lead equines unable to perform natural behaviors. At the end of working day donkeys are seen together groom each other, nuzzle and interact. Rolling also observed at this time. Following social interaction, the animals will seek out water and drink as a communal group. This repeatable observation suggests that socialisation is the first priority for fatigued and dehydrated animals, followed by drinking. Following further social interaction, donkeys begin to forage over nearby land and the appearance of depression and apathy gradually disappears. Similar observations of horses revealed that horses subject to physical assault will risk injury to engage in social foraging.

Donkeys Welfare and the People: Constraints such as poverty and lack of knowledge of the people mean that animal welfare is being compromised internationally. When working donkeys can no longer work, the owners lose their livelihoods, either temporarily or permanently. The welfare of working donkeys in developing countries is therefore crucially important, not only for the health and survival of those animals, but also for the livelihoods of those people dependent on them [7].

In Ethiopia demonstrated that the -importance of improved work output of the donkey is achieved through improvements in the donkey welfare. Thus, the adoption of good donkey health, welfare and working practices is among the most important ways that people in poor countries can help, secure and improve their incomes [20].

Relation Between Welfare and Health: Health is a part of welfare. When an animal health is poor, so its welfare, but poor welfare does not always imply poor health. There are many circumstances where behavioural or physiological coping mechanism is activated indicating that welfare is poor, but animal health remains good. Body damage and disease, which refer in this case to infectious disease, this indicates that poor welfare. The prevention of normal physiological process and anatomical development will also indicate poor health where these phenomena can be shown to be symptoms of an infectious, metabolic or nutritious disease. Mortality rates also an indicator of welfare in general and health in particular in many circumstances. When animals are closed to death, their welfare and their health will often be very poor. Other

indicator of poor welfare, though not signs of poor health at that time, may indicate risk of poor health in future. This include immune suppression, which renders an animal susceptible to infection the chronic activation of physiological coping mechanisms, which may cause immune suppression; and certain behavioral pathologies and redirected behavior, which can result in serious injury or predisposing to infection, either in the animal itself or in the others. It is these measures the review focuses on, since poor welfare proceeds poor health and is instrumental its deterioration [21].

Suitability of Stock: A working animal should be appropriate to its working environment and to the work to be done. It should be calm and attentive, properly fed and broken in and trained in an enlightened manner. Every effort must be made to ensure that the most appropriate animals are used, taking into consideration size, temperament, tractability, health; age and suitability to the environmental conditions [22].

Nutrition: In order to perform well, donkeys need to receive feed of a suitable quantity and quality. Communal grazing systems are common throughout sub-Saharan Africa. These communal grazing systems support not only working animals but other stock as well and are often over-used. If supplementary feed is given to donkeys it is usually only when grazing is poor. However, in urban areas, are given supplementary feeding as a matter of course. Donkeys, which are used throughout the year, require more feed than those used for only short periods of time seasonally [23].

A further two concerns are with the time that donkeys are allowed to graze and the availability of water. Due to stock theft, predation and to facilitate catching animals for harnessing, the majority of bovines and a large percentage of donkeys are kept in camps or kraals at night. This confinement, together with work regimes, often limits the time animals can spend grazing and may result in a poorer level of nutrition and the animals not being able to meet their energy requirements. Frequent and adequate watering is vitally important for donkeys confined to harness and provision must be made to fulfil this need. If donkeys are not maintained in a reasonable condition during the dry seasons, they will be physically weak and their productivity will be affected. Because these donkeys cannot perform to their full capacity at the onset of the rainy season, more donkeys may be required to perform the function that fewer donkeys in good condition could have undertaken [24].

Hoof Care: Hoof care is of greatest concern with regards to equids, particularly donkeys, either with overgrown hooves or poor shoeing. Donkeys are used for commercial carting purposes, which entails being used frequently on tar roads and if not shod, animals can become lame due to excessive hoof wear. Shoeing is necessary in these circumstances. However even where qualified farriers are available, the costs involved in shoeing are prohibitive for many owners. As a result owners resort to either shoeing their donkeys themselves or using a local person who has some knowledge in this subject. In many cases shoes are not changed frequently enough and are not removed until they are virtually worn out. The need for suitable farriers is greater under these circumstances, than in rural areas where animals work more often on the land or farm tracks [25].

Physiological Coping Mechanism and Infectious Disease in Donkeys: The relationship between the chronic activation of physiological coping mechanism, immune modulation and susceptibility to infectious disease; However, the relationship is not a simple one. The response of the neuro-endocrine system is not the same for all environmental challenges. It may also vary between species and between individuals depending on how they perceive the challenge. Glucocorticoids and other hormone modulate the immune system in various ways. A given change in the immune system, may affect an animal susceptibility to different pathogens in different ways. Glucocorticoids have certain, relatively uniform effect on the immune system. They reduce the number of circulating lymphocytes (lymphopenia) and increase the number of neutrophils (neutrophilia). In many species, they also reduce the number of eosinophils (eosinopenia). In species with relatively high number of lymphocytes such as chicken, this change results in a reduction in total number of circulating leukocyte (leucopenia). Where as in species with relatively low number of lymphocyte, including cattle, sheep and pig the net result is increased leukocyte count (leukocytosis). What is clear from the study of psychoneuroimmunology is that environmental condition that elicit physiological coping response in animals and that can therefore be said to cause poor welfare, alter their susceptibility to infectious agent and hence their health status [25].

Wound and its Main Causes: A wound is a break in the skin/epidermis which is usually caused by many reasons. It is caused by improper harness and saddle design in both donkeys and horses than other causes of injuries.

Donkeys are involved in a wide array of activities, yet very little management was accorded to them. They are made to carry heavy loads over long distances and hours. The donkeys in Kenya develop extensive sores and wounds due to overworking and overloading. Injuries are commonly distributed on wither and back coinciding with poorly designed and ill-fitted harnesses and saddles manufactured by unskilled artisans, equine-drawn carts are often designed unbalanced and too heavy and do not consider load distribution in relation to the body balance and style of movement. Damages caused by barbed wire and other sharp objects are common causes of lesions in donkeys in central Ethiopia. Trauma due to fighting among donkeys and hyena bites are other major causes of bite related injuries. One of the major problems which are a potential threat to the lives of working donkeys in central Ethiopia is hyena bite [19]. Poor physical condition due to malnutrition is the leading causes of sores in donkeys. The other point of husbandry practices can also affect welfare, like some methods of hobbling to restrain donkeys' causes discomfort and even severe wounds [26] (Figure 1).

Lameness and its Causes: Lameness is an indication of structural or functional disorder in one or more limbs that manifested during progression or standing position, which is often only recognized at an advanced stage [1]. Lameness can be caused by trauma, congenital or acquired anomalies, infection, metabolic disturbance, circular and nervous disorder or any combination of these [27].

Behavior and Factors Affecting it: A greater understanding of the behavior of donkeys provides a useful indicator. The behavior of working animal is modified by its work and husbandry regime. Although donkeys appear adaptable, it is not known to what extent they are able to compensate by behavioral modification and how stressful the resulting changes are to the donkeys [21].



Fig. 1: Wound caused by overloading

Body Condition Score (BSC): The body condition seems to have the closest correlation with teeth abnormality of the animal. That is poor teeth could lead to poor welfare and which conversely could lead to poor body condition score. In extreme dental abnormalities, decreased feed and possibly in efficient feed digestion and utilization may eventually occur, leading to weight loss [28].

African Horse Sickness (AHS): It is non-infectious arthropod-borne disease of equine and which is caused by an *orbivirus*. Donkeys are often described as being relatively resistant to the disease, although clinical cases have been reported in Egypt. Donkeys have been implicated in the spread of AHS, but their specific role in its epidemiology is poorly defined. They are unlikely to be long-term reservoirs of the AHSV, but they are silent reservoirs [28].

Epizootic Lymphangitis: It is a contagious chronic disease caused by the dimorphic fungus; *Histoplasma Capsulatum Var. farciminosum*. The DHWP in Ethiopia treated 34 cases of EPL in donkeys over 18 months of period. This was predominantly of the cutaneous form [29].

Rabies: Rabies is a fatal neurological disease that can occur in all mammals. Donkeys are at risk of attack by rabid dog or hyena as they are often kept outside at night or allowed to wander freely. It has been stated that donkeys are over-represented in livestock being attacked by rabid animals and this has been attributed to their spontaneous aggression towards inquisitive canines [1].

Trypanosomosis: Trypanosomosis in equine is caused by trypanosomes protozoans, of which *T. equiperdium*, the cause of dourine, which is transmitted through mating and *T. evansi* the cause of surra, which is transmitted by flies [1].

Strongyles: Strongyles live as adult in large intestine of equidae, including donkey and commonly categorized as small and large *strongyle*. The common small strongyles are *Cyathostomins*, adult worms live in the large intestine and have non-migratory life cycle. *Strongyle vulgaris* is the one of the common large *strongyle* which causes vascular damage due to their migration [4].

Lung Worm (*Dictyocaulus arnfieldi*): Donkeys are assumed to be the natural host of this parasite. They tolerate even large infestation of lung worms without apparent signs [1].

Habronemiasis: Cutaneous habronemiasis (summer sore) is a granulomatous skin disease caused by aberrant *habronema* larvae. The problem is common during warm weather coinciding with the period of high fly activities which lies on the body part that commonly have wound, moisture or discharge [4].

Lice Infestation: The major dermatological problems seen in severe lice infestation among working donkeys is skin irritation, pruritus, often causing self-inflicted trauma with extensive alopecia. Dense lice infestations are commonly observed during cooler periods, often covering moist of the body. The young donkeys of >3 years of age and older donkeys in poor conditions usually have the heaviest burdens [4].

Mange: Some of these are *chorioptes*, *psoroptes*, *sarcoptes* and *demodex* mites may be found in donkeys, but little information is available on their prevalence in donkey [1].

Stomach Bots (*Gastrophilus*): The larvae of flies, have adult stage that occur externally which could classify them as exo-parasite and larvae that live internally put them in the end parasite categories [1].

Strangle: Strangles is an infectious, contagious disease of equidae characterized by abscessation of the lymphoid tissue of the upper respiratory tract. The causative organism, *Streptococcus equiequi*, is highly host-adapted and produces clinical disease only in horses, donkeys and mules. It is a gram-positive, capsulated α -hemolytic Lancefield group C. coccus, which are an obligate parasite and a primary pathogen [1].

CONCLUSION

There is welfare problem of donkeys mainly due to bad management practices and health problems. The possible solution to improve the welfare of donkeys is by creating awareness to the community. The main reason for the mismanagement, ill-treatment, traditional malpractices of donkeys could be many folds; lack of education and training, the poor economy of the owners, the perception by the people that donkeys do not get ill or can tolerate problems may also play a big role. Based on the above conclusions, the following recommendations are forwarded:

- Proper veterinary health care and diseases prevention strategies should be designed.

- Better community education, awareness creation and training of both professionals and donkey owners as to donkey related technologies, basic management, health care and welfare problems of donkeys should be made.
- There should be integrated stakeholders participation to improve the welfare of donkeys.

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