

Perceptions and Welfare of Donkeys in Southern Namibia

Bernard Anotida Chiwome¹, Borden Mushonga¹, Vendaapi Mbeserua², Alaster Samkange^{1*}, Pricilla Mbiri¹, Oscar Madzingira³, ErickKandiwa¹

¹School of Veterinary Medicine, Faculty of Agriculture and Natural Resources, University of Namibia, P. Bag 13301, Pionierspark, Windhoek, Namibia

²Department of Animal Science, Faculty of Agriculture and Natural Resources, University of Namibia, P. Bag 13301, Pionierspark, Windhoek, Namibia

³Department of Animal Health, School of Veterinary Medicine, Faculty of Agriculture and Natural Resources, University of Namibia, P. Bag 1096, Katima Mulilo, Namibia

*Corresponding author: Alaster Samkange, P.O. Box 32376, Pionierspark, Windhoek, Namibia, Tel: +264 81 2429053, E-mail: alastersamkange@gmail.com

Abstract

This survey investigated the perceptions of 177 respondents on the value, socioeconomic roles, husbandry practices, health and welfare of donkeys in six communities from the //Kharas region of Namibia. Most respondents were males (71.2%) over 40 years of age (37.3%), of the Nama tribe (79.7%) that were unemployed (74.6%). Most of the respondents' households owned up to three donkeys (47.5%) which were mostly inherited (45.8%). The monetary value of donkeys ranged from US\$67.00-100.00. Donkey-drawn carts with more than four donkeys/cart (50.8%) were used for 30 to 50 km journeys once/week (81.4%). Most respondents did not house (78%), feed (71.2%) or water (67.8%) their donkeys. Donkeys grazed extensively and drank water from communal water points. Most respondents ate donkey meat in not more than four meals/week (81.4%) though 62.7% of all respondents preferred donkey meat to other meat. Beating and routine husbandry practices like castration, ear-notching and hot iron branding were perceived as the main causes of pain in donkeys (59.3% and 40.7%, respectively). Lameness, ataxia and dyspnoea/diaphoresis (45.8%, 25.4% and 23.7%, respectively) were the perceived signs of pain, whilst anorexia/poor body condition and skin lesions (40.7% and 40.7%, respectively) were the perceived signs of illness reported by the respondents. Diseased donkeys were treated with *Aloe vera* (76.3%). Despite the majority of respondents (76.3%) reporting scarcity of veterinary services, diseased donkeys were reported by 49.2% of the respondents. The central role of donkeys in the livelihoods of respondents from the //Kharas region necessitates improvement of donkey health and welfare through better veterinary services, education and awareness campaigns.

Keywords: Donkeys; Husbandry; Welfare; Illness; //Kharas

Background

Donkeys are an important farm animal species that descended from the African wild ass (*Equusafricanus*), which evolved within and adapted to dry and mountainous conditions with limited access to water and poor quality sparse vegetation^[1-4]. The low cost of purchase and maintenance of donkeys, their relatively small size, ease of training and handling, highly effective digestive system and their ability to withstand thirst has endeared them to small scale farmers and the poor living in peri-urban, remote and hostile environments with no infrastructure and road access^[5,6].

The current world donkey population is between 43 and 44.3 million^[5,7-9], half of which are reportedly in Asia, with over 25% in Africa^[5] and the majority of the remainder in South America^[10]. Over 32% of African donkeys are resident in Ethiopia^[11-13] with smaller isolated populations in west Africa^[2,14-17], Kenya^[18], southern Africa^[6,19-21], including Namibia^[22]. There are few studies with much variation documenting donkey population estimates in Namibia. Mudamburi et al., (2004) estimated the donkey population in the Northern Communal areas (NCA) of Namibia at more than 32 297. There is an estimated population of 159,000 donkeys in Namibia^[23].

Since their domestication, donkeys have been used as beasts of burden^[24], providing traction and transport for humanity^[25,26]. They play important socio-economic roles

Received Date: September 24, 2019

Accepted Date: October 01, 2019

Published Date: October 04, 2019

Citation: Samkange, A., et al. Perceptions and Welfare of Donkeys in Southern Namibia (2019) J Vet Sci Ani Wel 3(1): 44-56.

Copy Rights: © 2019 Salah Eldeen, A. A. This is an Open access article distributed under the terms of Creative Commons Attribution 4.0 International License.

in the household^[16] agriculture^[27], industry/commerce^[12] and in human medicine and/or nutrition^[2]. They are used for performing household chores such as fetching water, firewood, charcoal dung and carrying farm produce to homesteads or for taking raw grain to grinding mills^[2,28,29]. In Pastoralist systems, donkeys are used to transport household effects and even entire households when herders move from one place to another^[24]. More recently, donkeys have also gained a role as pets and companion animals^[4,24].

Donkeys play a major role in the agricultural economy of communities through provision of manure, draught power for tillage, planting and weeding and transportation of farm produce^[2,16,21,30]. They are also important in the construction industry for the transportation of building materials such as bricks, sand, gravel and cement^[28,31,32]. Donkeys have also been used to conduct military campaigns^[19] to carry arms of war and ammunition in remote and inaccessible places^[28,33].

According to some authors donkeys have been found as the most cost-effective mode of transport in peri-urban communities for farmers and merchants^[33,34]. Donkeys are used for income generation through carting goods, ferrying people and tourists' riding tours^[11,12,35]. In addition, donkeys can be hired to other people in exchange for cash or other goods. Donkey buying and selling has been identified as a lucrative business in Nigeria^[2] and Ethiopia^[34].

Donkeys also play important roles in human nutrition, medicine and cosmetics^[4,36,37]. It has been reported that donkey milk is a very good replacement for cattle milk in infants with bovine milk allergies and an effective skin toner^[37]. Some communities value donkey meat very highly^[4]. Less common roles of donkeys include being used in police patrol duties and as guard animals for sheep against predators on farms^[32,38].

Despite all the advantages that donkeys present to their care-givers, owners and society at large, they often suffer from poor husbandry practices^[32,39,40], poor health^[16,21], mistreatment and therefore compromised welfare^[11,12]. Reasons for this poor quality of life visited on donkeys by their care-givers include poverty and negative attitudes (regarding animals as instruments)^[26]. Some donkeys suffer neglect^[5,13] and are often beaten in the course of their duties^[21,39,40]. Furthermore, Governments of developing countries rarely make budgetary provisions for the health and welfare of less regarded species like donkeys. Poor husbandry practices and work ethic including poor housing^[32,39], inadequate feed and water^[29] often result in donkeys being plagued by poor body condition^[31] poor hoofcare^[40], poor harnessing^[28,34] and overworking in hot and dry climatic conditions^[17,20].

The world over, non-governmental organizations such as SPANA, Donkey Sanctuary^[4], Brooke^[27,31], Society for the Protection of Animals Abroad^[15] have intervened by taking over responsibility for primary healthcare and welfare awareness campaigns. Although the SPCA is heavily involved in general animal welfare, they are more into pets and policing of welfare abuses of farm and pet animals in urban and peri-urban centres. These organizations have funded research to gain a better understanding of the conditions leading to poor donkey welfare and educational awareness campaigns to reduce the ban.

Donkey welfare can be assessed using direct, indirect or a combination of both methods^[41,42]. Direct or animal

based methods use primary data obtained directly from the animals through physical examination and/or body condition scoring^[3,11,35], behavioural and emotional parameter measurement^[15,20]. Indirect methods include surveys in which information obtained from secondary sources (owners, animal health owners) through questionnaires^[14,32,43] and focussed group discussions^[28] or rapid rural appraisals are used^[22]. In the past, donkey welfare assessment was done through evaluation of the five freedoms^[44] but more recent tools such as the Hands-On Donkey Tool have been developed^[25].

Donkeys obviously play important socioeconomic roles such as supplying energy requirement for the homestead, farm and the local economy in certain parts of Namibia. There are several studies, bringing to the fore, the roles of donkeys, their problems and some proposed solutions globally^[4,25,27,35,45], on the African continent^[5,15,40], the sub region^[20,21,46] and even in Namibia^[22]. Reports from Namibia are rare. One study reported on donkeys from the NCD of Namibia^[22], another one reported on proposed solutions for donkey road traffic accidents (Jones and Hay, 2005) but there are no reports from the southern regions of Namibia. The objective of this study was, therefore, to investigate the demographics, ownership patterns, husbandry practices, health management practices, welfare and socioeconomic roles of donkeys in six communities in southern Namibia.

Materials and Methods

Study area

Six villages in the //Kharas region of southern Namibia, namely Berseba, Bethanie, Gainhas, Kutsenhoe, Vaalgras and Tses were randomly chosen for this study. Due to the semi-desert to desert conditions prevailing in this region, donkeys are an important mode of transport and a valuable resource. The //Kharas region is characterised by a Nama-Karoo biome dominated by grassy, dwarf shrub land receiving 100-250mm of annual rainfall^[47].

Study sample

The study sample comprised of the responding donkey owners from the six selected villages. The sample size (n=177) was determined by using the formula for sample size calculation^[48] at 95% confidence level and the population of donkey owners registered within the six villages under study (N=328):

$$n = N * X / (X + N - 1),$$

Where,

$$X = Z_{\alpha/2} * p * (1-p) / MOE^2$$

$Z_{\alpha/2}$ is the critical value of the Normal distribution at $\alpha/2$, α is 0.05 and the critical value is 1.96, MOE is the margin of error, p is the sample proportion, and N is the population size.

The questionnaires which were used had fixed-alternative (negative/affirmative responses), scale (perceived values and prices of animals and accessories) and open-ended questions. Trained assistants with a good command of local languages administered the questionnaires to the respondents. Information gathered included the demographic characteristics

of donkey owners, the perceived value of donkeys, husbandry practices pertaining to donkeys, dietary preferences of donkey owners, practices relating to the role of the donkey in the transportation of village inhabitants, the general perceptions of donkey health and the level of veterinary care.

Statistical analysis

A summary of the responses from respondents was tallied on a Microsoft Excel 2013 spreadsheet. Questions were then partitioned into separate tables within which categories of between two and five were designed to classify these responses. The Pearson’s Chi square test was used to test for dependence/independence of the responses on the villages under study whereby

$p \leq 0.05$ was considered significant. The adjusted residuals methods were used post hoc for further analysis of significant chi square results. The Z-test for comparison of proportions was used to compare overall proportions of responses and likewise $p \leq 0.05$ was considered significant. The Statistical Package for Social Sciences (SPSS) version 25 was the chosen software for statistical analysis.

Results

As shown in Table 1, the respondents under study were from Berseba, Bethanie, Gainhas, Kutsenhoos, Tses and Vaalgras (20.3%, 32.2%, 16.9%, 6.8%, 5.1% and 18.6%; respectively, n

Table 1: Demographic summary of the respondents (n=177) sampled from six villages in southern Namibia.

Category	Berseba (%)	Bethanie (%)	Gainhas (%)	Kutsenhoos (%)	Tses (%)	Vaalgras (%)	Total (%)
Gender of respondent							
Female	3,4	5,1	8,5	5,1*	0,0	6,8	28,8 ^a
Male	16,9	27,1	8,5	1,7	5,1	11,9	71,2 ^a
Age category							
<30years	8,5	13,6	3,4	3,4	0,0	6,8	35,6
30 to <40years	5,1	10,2	1,7	1,7	1,7	6,8	27,1 ^a
≥40years	6,8	8,5	11,9*	1,7	3,4	5,1	37,3 ^a
Tribe							
Damara	0,0	1,7	0,0	0,0	0,0	5,1*	6,8 ^b
Herero	1,7	0,0	0,0	1,7	1,7*	1,7	6,8 ^a
Nama	15,3	30,5*	16,9	3,4	1,7	11,9	79,7 ^{abc}
Oorlam	3,4	0,0	0,0	1,7	1,7*	0,0	6,8 ^c
Household size							
up to 4	8,5	11,9	8,5	3,4	3,4	6,8	42,4 ^a
5 to 9	6,8	18,6*	5,1	0,0	0,0	3,4	33,9 ^b
above 10	5,1	1,7	3,4	3,4	1,7	8,5*	23,7 ^{ab}
Gender of Household head							
Female	11,9*	8,5	3,4	3,4	0,0	3,4	30,5 ^a
Male	8,5	23,7	13,6	3,4	5,1	15,3	69,5 ^a
Highest Educational level							
None	13,6*	11,9	0,0	1,7	3,4	3,4	33,9 ^{dc}
Primary	3,4	8,5	3,4	0,0	1,7	3,4	20,3 ^{acd}
Secondary	1,7	11,9	11,9*	3,4	0,0	11,9	40,7 ^{ab}
Tertiary	1,7	0,0	1,7	1,7*	0,0	0,0	5,1 ^{bce}
Number of employed household members							
None	16,9	25,4	10,2	3,4	5,1	13,6	74,6 ^{abc}
One	3,4	3,4	5,1	3,4*	0,0	1,7	16,9 ^{ade}
Two	0,0	3,4	0,0	0,0	0,0	3,4	6,8 ^{bdf}
Three	0,0	0,0	1,7*	0,0	0,0	0,0	1,7 ^{cef}
Annual income per household (NAD\$)							
None	5,1	20,3*	8,5	1,7	1,7	1,7	39,0 ^{abc}
up to 15000	11,9*	6,8	3,4	1,7	0,0	10,2	33,9 ^{ade}
15001 to 30000	3,4	5,1	3,4	1,7	1,7	5,1	20,3 ^{bdf}
over 30000	0,0	0,0	1,7	1,7	1,7*	1,7	6,8 ^{cef}
Total	20,3	32,2	16,9	6,8	5,1	18,6	100,0

Total Proportions bearing the same suffix^{abcd} were significantly different since $p \leq 0.05$; *Village proportions greater than expected since $p \leq 0.05$.

= 177). The proportions of male and female respondents varied with the village under study [$X^2(5, n=177) = 30.91, p<0.001$]. Overall, the proportion of male respondents was significantly greater than that of the females ($p<0.001$). The proportion of female respondents in Kutsenhoos was greater than expected (5.1%, $p<0.05$). The proportions of the age categories of respondents was dependent on the village studied [$X^2(10, n=177) = 26, p<0.01$]. The proportion of respondents aged over 40years of age in Gainhas was greater than expected (11.9%, $p<0.05$). Overall, the proportion of respondents aged over 40years were significantly greater than that of those aged between 30 and 40years ($p<0.05$).

The proportional distribution of respondents' tribes was dependent on the villages under study [$X^2(15, n=177) = 84.72, p<.001$]. The proportions of Nama respondents in Bethanie, Herero respondents in Tses, Oorlam respondents in Tses and Damara respondents in Vaalgras were greater than expected (30.5%, 1.7%, 1.7% and 5.1%; respectively, $p<0.05$). The num-

ber of respondents from the Nama tribe were significantly greater than the rest of the tribes (79.7%, $p<0.001$). The categorised number of household members was dependent on the villages under study [$X^2(10, n=177) = 40.67, p<0.001$]. The proportion of respondents from Bethanie whose households had five to nine members and those from Vaalgras whose households had more than 10 members were greater than expected (18.6% and 8.5%; respectively, $p<0.05$). Overall, the proportion of respondents from households with not more than four members was significantly greater than expected.

The proportions of male and female headed households from whence the respondents came were dependent on the village under study [$X^2(5, n=177) = 213.55, p<0.001$], but the proportion of male heads of households was significantly greater than that of female heads of households (69.5% and 30.5%; respectively, $p<0.001$). The proportion of female headed households in Berseba was greater than expected (11.9%, $p<0.05$). The proportional distribution of the highest level of education of the

Table 2: Summary of donkey ownership by respondents from six villages in southern Namibia

Category	Berseba (%)	Bethanie (%)	Gainhas (%)	Kutsenhoos (%)	Tses (%)	valgras (%)	Total (%)
Respondents who owned donkey(s)							
Affirmative	3,4	3,4	5,1	3,4	3,4*	1,7	20,3 ^a
Negative	16,9	28,8	11,9	3,4	1,7	16,9	79,7 ^a
Number of animals owned							
None	0,0	5,1*	0,0	0,0	0,0	0,0	5,1 ^{bcd}
1 to 5	8,5	8,5	0,0	1,7	1,7	10,2*	30,5 ^c
6 to 20	11,9*	5,1	10,2	0,0	1,7	6,8	35,6 ^{ab}
more than 20	0,0	13,6	6,8	5,1*	1,7	1,7	28,8 ^{ad}
Number of donkeys owned							
up to 3	11,9	18,6	3,4	3,4	3,4	6,8	47,5 ^{ab}
4 to 6	6,8	8,5	5,1	1,7	1,7	11,9*	35,6 ^{ac}
7 to 10	1,7	5,1	8,5*	1,7	0,0	0,0	16,9 ^{bc}
Source of donkeys							
Barter trade	1,7	0,0	1,7	0,0	0,0	3,4*	6,8 ^{df}
Purchase	1,7	5,1	5,1	5,1*	5,1	6,8	28,8 ^{aefg}
Gift	3,4	5,1	1,7	0,0	0,0	0,0	10,2 ^{bc}
Gift and inheritance	1,7	6,8*	0,0	0,0	0,0	0,0	8,5 ^{cg}
Inheritance	11,9	15,3	8,5	0,0	3,4	6,8	45,8 ^{abcd}
Perceived cost of a donkey							
600 to <1000	5,1	8,5	1,7	1,7	0,0	15,3*	32,2 ^{ac}
1000 to <1500	15,3	18,6	11,9	5,1	1,7	1,7	54,2 ^{ab}
>1500	0,0	5,1	3,4	0,0	3,4*	1,7	13,6 ^{bc}
Source of cart and restraint equipment							
Barter trade	1,7	0,0	1,7	1,7	1,7	1,7	8,5 ^{cde}
Purchase	0,0	5,1	5,1	1,7	0,0	8,5*	20,3 ^{ad}
Self-made	15,3	22,0	5,1	1,7	3,4	8,5	55,9 ^{abc}
Gift and/or inheritance	3,4	5,1	5,1	1,7	0,0	0,0	15,3 ^{bc}
Housing provision for donkeys							
Negative	13,6	25,4	13,6	5,1	3,4	16,9	78,0 ^a
Affirmative	6,8	6,8	3,4	1,7	1,7	1,7	22,0 ^a
Total	20,3	32,2	16,9	6,8	5,1	18,6	100,0

Total Proportions bearing the same suffix^{abcdet} were significantly different since $p<0.05$; *Village proportions within same category greater than expected since $p<0.05$.

respondents was dependent on the village under study [$X^2(15, n=177) = 72.33, p<.001$]. Overall, the proportion of respondents with secondary level education was significantly greater than the rest (40.7%, $p<.001$). The proportion of respondents with no education from Berseba, those with secondary level education from Gainhas and those with tertiary level education from Kutsenhoe were greater than expected (13.6%, 11.9% and 1.7%; respectively, $p<.05$).

The proportional distribution of employed family members per household was dependent on the village under study [$X^2(15, n=177) = 46.11, p<.001$]. Overall, the proportion of respondents that came from households where no one was employed was significantly greater than the rest (74.6%, $p<.001$). The proportion of respondents whose households had at least one employed household member was significantly greater than those whose household members were unemployed (61% and 39%; respectively, $p<.001$). Respondents from Gainhas whose households had three employed family members and those from Kutsenhoe whose households had only one employed member had a greater proportion than expected (1.7% and 3.4%; respectively, $p<.05$). The level of income from members of the respondents' households was dependent on the village under study [$X^2(15, n=177) = 62.57, p<.001$]. The proportions of members of respondents' households from Berseba earning less than US\$1000 per annum, those unemployed from Bethanie and those earning more than US\$2000 per annum from Tses were greater than expected (11.9%, 20.3% and 1.7%; respectively, $p<.05$).

As shown in Table 2, the proportion of respondents that owned donkeys was dependent on the village under study [$X^2(5, n=177) = 26.43, p<.001$]. The proportion of respondents from Tses that owned donkeys was greater than expected (3.5%, $p<.05$). Overall, results show that the proportion of respondents that did not own donkeys was significantly greater than those that owned donkeys (79.7% and 20.3%; respectively, $p<.001$). The ownership of donkeys by respondents' households was dependent on the village under study [$X^2(15, n=177) = 85.69,$

$p<.001$]. The proportion of respondents from households in Berseba owning six to 20 animals, households from Bethanie owning no animals, households from Kutsenhoe owning more than 20 animals and those from Vaalgras owning not more than five animals were greater than expected (11.9%, 5.1%, 5.1% and 10.2%; respectively, $p<.05$). Overall, however, the proportions of respondents' households owning six to 20 animals were significantly greater than the rest (35.6%, $p<.05$).

The proportional ownership of donkeys by respondents' households was dependent on the villages under study [$X^2(10, n=177) = 46.45, p<.001$]. The proportion of respondents from Gainhas whose households owned seven to 10 donkeys and those from Vaalgras whose households owned four to six donkeys were significantly greater than expected (8.5% and 11.9%; respectively, $p<.05$). Overall, however, the proportion of respondents whose households owned not more than three donkeys were significantly greater than the rest (47.5%, $p=0.02$). The source of donkeys for respondents' households was dependent on the villages under study [$X^2(20, n=177) = 76.97, p<.001$]. The proportions of respondents' households in Bethanie that obtained donkeys from inheritance or as gifts, those from Kutsenhoe that purchased donkeys and those from Vaalgras that obtained donkeys through barter-trading were greater than expected (6.8%, 5.1% and 3.4%; respectively, $p<.05$). Overall, however, the proportion of respondents' households that obtained donkeys through inheritance was significantly greater than the rest (45.8%, $p<.05$).

The perceived value of a donkey was dependent on the village under study [$X^2(10, n=177) = 79.4, p<.001$]. The proportion of respondents from Tses that perceived the value of a donkey to be in excess of US\$100 and those from Vaalgras that perceived the value of a donkey to be US\$40-67 were greater than expected (3.4% and 15.3%; respectively, $p<.05$). Overall, however, the proportion of respondents perceiving the value of a donkey to be US\$67-100 was significantly greater than those from the other categories (54.2%, $p<.05$). The source of carts and restraint equipment for respondents was dependent on the

Table 3: Summary of feed and water provisions for donkeys from six villages in Southern Namibia

Category	Berseba (%)	Bethanie (%)	Gainhas (%)	Kutsenhoe (%)	Tses (%)	valgras (%)	Total (%)
Purchase of donkey feed							
Affirmative	8,5	3,4	5,1	1,7	3,4	6,8	28,8 ^a
Negative	11,9	28,8	11,9	5,1	1,7	11,9	71,2 ^a
Cost of donkey feed/week (US\$)							
up to 6.7	1,7	1,7	0,0	0,0	1,7	3,4	8,5 ^{cc}
6.7 to 13.3	1,7	1,7	3,4*	0,0	0,0	0,0	6,8 ^{bd}
>13.3	5,1	0,0	1,7	1,7	1,7	3,4	13,6 ^{ade}
No feed purchased	11,9	28,8*	11,9	5,1	1,7	11,9	71,2 ^{abc}
Source of drinking water for donkeys							
House	11,9*	8,5	1,7	1,7	1,7	6,8	32,2 ^a
Water point	8,5	23,7	15,3	5,1	3,4	11,9	67,8 ^a
Frequency of donkeys' drinking							
Daily	18,6*	8,5	10,2	3,4	5,1*	6,8	52,5
Every other day	1,7	23,7*	6,8	3,4	0,0	11,9	47,5
Total	20,3	32,2	16,9	6,8	5,1	18,6	100,0

Total Proportions bearing the same suffix^{abcd} were significantly different since $p\leq 0.05$; *Village proportions within same category greater than expected since $p\leq 0.05$.

village under study [$X^2(15, n=177) = 58.74, p<0.001$]. The proportion of respondents from Vaalgras that purchased carts and restraint equipment was greater than expected (8.5%, $p<0.05$). Overall, however, the proportion of respondents relying on self-made carts and restraint equipment was significantly greater than the rest (55.9%, $p<0.001$). The proportion of respondents that had housing provisions for donkeys was independent of the village under study [$X^2(5, n=177) = 6.73, p=0.24$]. Overall, however, the proportion of respondents that did not have housing provisions for their donkeys was significantly greater than those that had housing provisions for their donkeys (78% and 22%; respectively, $p<0.001$).

As shown in Table 3 below, the proportion of respondents that purchased feed for donkeys was dependent on the villages under study [$X^2(5, n=177) = 19.5, p=0.01$]. The proportion of respondents from Bethanie and Gainhas who did not purchase feed for donkeys and those from Gainhas who purchased feed for donkeys were greater than expected (28.8%, 11.9% and 5.1%; respectively, $p<0.05$). Overall, the proportion of respondents who did not purchase donkey feed were significantly greater than those that purchased feed for donkeys (71.2% and 28.8%; respectively, $p<0.001$). The cost of donkey feed at the

disposal of the respondents was dependent on the village under study [$X^2(15, n=177) = 47.58, p=0.001$]. The proportion of respondents that spent US\$6.70-US\$13.33 per week on donkey feed from Gainhas and the proportion of respondents that did not purchase donkey feed from Bethanie were greater than expected (3.4% and 28.8%; respectively, $p<0.05$). Overall, however, the proportion of respondents purchasing donkey feed for more than US\$13.33 were significantly greater than those purchasing donkey feed for US\$6.70-US\$13.33 per week (13.6% and 6.8%; respectively, $p<0.05$).

The source of drinking water for donkeys was dependent on the village under study [$X^2(5, n=177) = 19.49, p<0.01$]. The proportion of respondents in Berseba whose donkeys had access to drinking water at the house were greater than expected (11.9%, $p<0.05$). Overall, however, the proportion of respondents whose donkeys depended on water points, away from the houses, for drinking water were significantly greater than the proportion of respondents whose donkeys had access to drinking water at the house (67.8% and 32.2%; respectively, $p<0.001$). The frequency of the access of donkeys to drinking water was dependent on the village under study [$X^2(5, n=177) = 50.12, p=0.001$]. The proportion of respondents in Berseba and Tses

Table 4: Summary of the role of donkeys in the diets of the inhabitants of six villages in Southern Namibia

Category	Berseba (%)	Bethanie (%)	Gainhas (%)	Kutsenhoës (%)	Tses (%)	valgras (%)	Total (%)
Preferred qualities for meat donkeys							
Good body condition and healthy	6,8	15,3	6,8	5,1	1,7	6,8	42,4 ^{abc}
Non-working donkey	3,4	6,8	1,7	0,0	1,7	3,4	16,9 ^{bc}
Mature donkey	8,5	3,4	5,1	1,7	1,7	3,4	23,7 ^{adc}
Young donkey	1,7	6,8	3,4	0,0	0,0	5,1	16,9 ^{cd}
Number of meals with donkey meat per week							
Up to 4	20,3*	27,1	15,3	3,4	3,4	11,9	81,4 ^a
More than 4	0,0	5,1	1,7	3,4*	1,7	6,8*	18,6 ^a
Number of people fed on one donkey							
Up to 10	10,2	18,6	11,9	3,4	1,7	3,4	49,2 ^{abc}
11 to 20	10,2	6,8	5,1	1,7	3,4	6,8	33,9 ^{adc}
21 to 30	0,0	1,7	0,0	1,7*	0,0	0,0	3,4 ^{bc}
more than 30	0,0	5,1	0,0	0,0	0,0	8,5*	13,6 ^{cd}
Preferred meat type							
Beef	1,7	5,1	0,0	0,0	1,7	1,7	10,2 ^{bch}
Chicken	0,0	0,0	5,1*	0,0	0,0	3,4	8,5 ^{efg}
Donkey	15,3	23,7	8,5	5,1	1,7	8,5	62,7 ^{abcd}
Sheep/goat	1,7	3,4	1,7	1,7	1,7	5,1	15,3 ^{acfi}
All of the above	1,7	0,0	1,7	0,0	0,0	0,0	3,4 ^{dghi}
Method of donkey slaughter							
Jugular exsanguination	18,6	23,7	13,6	5,1	3,4	11,9	76,3 ^a
Head shot	1,7	8,5	3,4	1,7	1,7	6,8	23,7 ^a
Support for trading in donkey skin							
Negative	3,4	6,8	5,1	1,7	0,0	0,0	16,9 ^a
Affirmative	16,9	25,4	11,9	5,1	5,1	18,6*	83,1 ^a
Total	20,3	32,2	16,9	6,8	5,1	18,6	100,0

Total Proportions bearing the same suffix^{abcdef} were significantly different since $p\leq 0.05$; *Village proportions within same category greater than expected since $p\leq 0.05$.

whose donkeys had daily access to water and those in Bethanie whose donkeys had access to drinking water every alternate day were greater than expected (18.6%, 5.1% and 23.7%; respectively, $p < 0.05$). Overall, however, there was no significant difference in the proportions of respondents whose donkeys had daily access to drinking water and the proportion of respondents whose donkeys had access to drinking water on alternate days (52.5% and 47.5%; respectively, $p > 0.05$).

As shown in Table 4, the proportions of respondent-preferred qualities in the choice of donkeys for human consumption were dependent on the village under study [$X^2(15, n=177) = 27.74, p=0.02$]. Overall, the proportion of respondents that preferred donkeys with healthy-looking bodies in good condition was significantly greater than those that preferred non-working donkeys, mature donkeys and young donkeys (42.4%, 16.9%, 23.7% and 16.9%; respectively, $p < 0.001$). The proportion of meals containing donkey meat eaten by respondents was dependent on the village under study [$X^2(5, n=177) = 25.92, p < 0.01$]. The proportions of respondents from Berseba eating not more than four meals per week containing donkey meat, those from Kutsenhoe and Vaalgras eating more than four meals containing donkey per week were greater than expected (20.3%, 3.4% and 6.8%; respectively, $p < 0.05$). Overall, however, the proportion of respondents eating not more than four meals containing donkey meat per week were significantly greater than those eating more than four meals containing donkey meat per week (81.4% and 18.6%; respectively, $p < 0.001$).

The number of people fed on meat from a single donkey as perceived by the respondents was dependent on the village under study [$X^2(15, n=177) = 76.84, p < 0.01$]. The proportions of respondents from Kutsenhoe insisting that a single donkey can be fed to 21-30 people and respondents from Vaalgras insisting that a single donkey can be fed to more than 30 people were greater than expected (1.7% and 8.5%; respectively, $p < 0.05$). Overall, however, the proportion of respondents that stated that a single donkey can be fed to not more than 10 people was significantly greater than those that mentioned 11-20 people, those that stated 21-30 people and those that suggested more than 30 people (49.2%, 33.9%, 3.4% and 13.6%; respectively, $p < 0.001$). The preference of various meat types by respondents was dependent on the village under study [$X^2(20, n=177) = 65.04, p < 0.01$]. The proportion of respondents from Gainhas preferring chicken meat was greater than expected (5.1%, $p < 0.05$). Overall, however, the proportion of respondents with a preference for donkey meat was significantly greater than those with a preference for beef, chicken, sheep/goat or with special preference (62.7%, 10.2%, 8.5%, 15.3% and 3.4%; respectively, $p < 0.001$). The preferred method of slaughter for donkeys destined for human consumption was independent of the village under study [$X^2(5, n=177) = 8.54, p=13$]. Overall, a significantly greater proportion of respondents used jugular exsanguination as a method for slaughtering donkeys than a head shot (76.3% and 23.7%; respectively, $p < 0.001$).

As shown in Table 4, the attitude of respondents on the donkey skin trade was dependent on the village under study [$X^2(5, n=177) = 13.44, p < 0.05$]. The proportion of respondents from Vaalgras in support of the donkey skin trade was greater than expected (18.6%). Overall, the proportion of respondents in support of the donkey skin trade were significantly greater than

those against the donkey skin trade (83.1% and 16.9%; respectively, $p < 0.001$).

As shown in Table 5, the respondents' ownership of mechanised transport was dependent on the village under study [$X^2(10, n=177) = 52.74, p < 0.001$]. The proportion of respondents from Kutsenhoe that owned motor vehicles and those from Vaalgras that did not own mechanised transport were greater than expected (3.4% and 18.6%; respectively, $p < 0.05$). Overall, there was no significant difference in the proportions of respondents that owned motor vehicles and of those that owned bicycles (8.5% and 10.2%; respectively, $p > 0.05$). Furthermore, the overall proportion of respondents that did not own mechanised transport was significantly greater than the overall proportion of respondents that owned mechanised transport (81.3% and 18.7%; respectively, $p < 0.001$). The cost of travel to the nearest town was dependent on the village under study [$X^2(10, n=177) = 87.17, p < 0.001$]. The proportion of respondents from Bethanie with no travel costs, the proportion of respondents from Gainhas with travel costs of up to US\$6.70 and the respondents from Vaalgras with travel costs above US\$6.70 were greater than expected (15.3%, 13.6% and 11.9%; respectively, $p < 0.05$). However, there was no significant difference between the proportions of respondents with travel costs below and above US\$6.70 (37.3% and 39%; respectively, $p > 0.05$).

The proportions of the respondents' preferential qualities for draught donkeys were dependent on the village under study [$X^2(15, n=177) = 51.42, p < 0.001$]. Overall, the proportions of respondents preferring alert and active donkeys and those preferring strong donkeys in good condition were significantly greater than the proportion preferring castrated male donkeys and those preferring female donkeys (30.5%, 35.6%, 22% and 11.9%; respectively, $p < 0.001$). The proportions of the respondents' undesirable qualities for donkeys destined for use as draught animals was dependent on the village under study [$X^2(10, n=177) = 77.01, p < 0.001$]. The proportion of respondents from Berseba disqualifying old donkeys and those in poor body condition for use as a source of draught power, those from Kutsenhoe disqualifying inactive and non-compliant donkeys and those from Vaalgras disqualifying pregnant donkeys were greater than expected (18.6%, 3.4% and 11.9%; respectively, $p < 0.05$). Overall, however, the proportion of respondents that disqualified donkeys for old age and poor condition was significantly greater than those that disqualified donkeys for inactivity and non-compliance and for pregnancy (61%, 17% and 22%; respectively, $p < 0.001$).

The maximum distances travelled by respondents and their donkeys were dependent on the village under [$X^2(10, n=177) = 75.49, p < 0.001$]. The proportion of respondents from Berseba and Kutsenhoe travelling 30 to ≤ 50 km by donkey, those from Bethanie travelling < 30 km, those from Gainhas and Vaalgras travelling more than 50 km were greater than expected (16.9%, 5.1%, 10.2%, 10.2% and 13.6%; respectively, $p < 0.05$). Overall, the proportion of respondents using donkeys to travel 30 to ≤ 50 km were significantly greater than those travelling < 30 km and those travelling more than 50 km (49.2%, 16.9% and 33.9%; respectively, $p < 0.001$). The number of journeys travelled by respondents using donkeys per week was dependent on the village under study [$X^2(10, n=177) = 49.87, p < 0.001$]. The proportion of respondents from Kutsenhoe travelling two journeys

by donkey weekly was greater than expected (3.4%, $p < 0.05$). Overall, however, the proportion of respondents travelling only once weekly by donkey was significantly greater than those travelling twice/week or thrice/week (81.3%, 8.5% and 10.2%; respectively, $p < 0.001$)

The number of donkeys used by respondents was dependent on the village under study [$X^2(10, n=177) = 49.79, p < 0.001$]. The proportion of respondents from Berseba using three to four donkeys/cart, those from Kutsenhoe using up to two donkeys/cart and those from Vaalgras using more than four donkeys/cart were greater than expected (11.9%, 3.4% and 15.3%; respectively, $p < 0.05$). Overall, however, the proportion of respondents using more than four donkeys per cart was significantly greater than those using three to four donkeys/cart and those using up to two donkeys/cart (50.8%, 33.9% and 15.3%; respectively, $p < 0.001$).

The respondents confirmation or negation of the occur-

rence of regular visits from veterinary or para-veterinary personnel was dependent on the village under study [$X^2(5, n=177) = 14.04, p < 0.05$]. Overall, the proportion of respondents that did not receive regular veterinary visits was significantly greater than those that received regular visits (76.3% and 23.7%; respectively, $p < 0.001$).

The frequency of veterinary visits received by the respondents were dependent on the village under study [$X^2(10, n=177) = 39.9, p < 0.001$]. The proportion of respondents from Bethanie that received two veterinary visits per year and those from Kutsenhoe that received one veterinary visit a year were greater than expected (8.5% and 3.4%; respectively, $p < 0.05$). Overall, however, there was no significant difference between the proportions of respondents that received one visit/year and those that receive two visits/year (13.6% and 13.6%; respectively, $p > 0.05$). The frequency of disease reported by respondents was dependent on the village under study [$X^2(5, n=177) = 66.93,$

Table 5: Summary of the role of donkeys in the transport of the inhabitants of six villages in Southern Namibia

Category	Berseba (%)	Bethanie (%)	Gainhas (%)	Kutsenhoe (%)	Tses (%)	valgras (%)	Total (%)
Ownership of mechanized transport							
None	16,9	27,1	10,2	3,4	5,1	18,6*	81,3 ^{ab}
Bicycle	1,7	5,1	3,4	0,0	0,0	0,0	10,2 ^a
Motor vehicle	1,7	0,0	3,4	3,4*	0,0	0,0	8,5 ^b
Cost of travel to nearest town by taxi (US\$)							
None	3,4	15,3*	0,0	1,7	1,7	0,0	22,0 ^{ab}
up to <6.70	11,9	3,4	13,6*	0,0	3,4	6,8	37,3 ^b
≥6.70	5,1	13,6	3,4	5,1	0,0	11,9*	39,0 ^a
Preferred qualities of donkeys used for draught power							
Alert and active	6,8	13,6	6,8	3,4	0,0	0,0	30,5 ^{ab}
Strong and with good body condition	1,7	10,2	6,8	3,4	3,4	10,2	35,6 ^{cd}
Castrated male	6,8	5,1	3,4	0,0	1,7	5,1	22,0 ^{ac}
Female	5,1	3,4	0,0	0,0	0,0	3,4	11,9 ^{bd}
Undesirable qualities of donkeys used for draught power							
Old age, poor body condition or diseased	18,6*	16,9	11,9	3,4	3,4	6,8	61,0 ^{ab}
Inactive and non-compliant	1,7	5,1	5,1	3,4*	1,7	0,0	17,0 ^a
Pregnancy	0,0	10,2	0,0	0,0	0,0	11,9*	22,0 ^b
Maximum distance travelled using donkeys							
< 30 km	3,4	10,2*	1,7	1,7	0,0	0,0	16,9 ^{ac}
30 km to < 50 km	16,9*	15,3	5,1	1,7	5,1*	5,1	49,2 ^{ab}
≥50 km	0,0	6,8	10,2*	3,4	0,0	13,6*	33,9 ^{bc}
Number of donkey journeys/week							
One	18,6	25,4	16,9	3,4	3,4	13,6	81,4 ^{ab}
Two	0,0	1,7	0,0	3,4*	0,0	3,4	8,5 ^a
Three	1,7	5,1	0,0	0,0	1,7	1,7	10,2 ^b
Donkeys used per cart							
Up to 2	3,4	6,8	1,7	3,4*	0,0	0,0	15,3 ^{ac}
3 to 4	11,9*	11,9	3,4	0,0	3,4	3,4	33,9 ^{bc}
>4	5,1	13,6	11,9	3,4	1,7	15,3*	50,8 ^{ab}
Total	20,3	32,2	16,9	6,8	5,1	18,6	100,0

Total Proportions bearing the same suffix^{abcdef} were significantly different since $p \leq 0.05$; *Village proportions within same category greater than expected since $p \leq 0.05$.

p<0.001]. The proportion of respondents from Berseba reporting a rare occurrence of sickness in donkeys and those from Bethanie that had never encountered sick donkeys were greater than expected (20.3% and 27.1%; respectively, p<0.05). Overall, there was no significant difference between the respondents that never encountered sick donkeys and those reporting a rare encounter with sick donkeys (50.8% and 49.2%; respectively, p>0.05).

The perception of lameness, epistaxis, dyspnoea, diaphoresis and ataxia by respondents as symptoms of sickness in donkeys was dependent on the village under study [X²(15, n=177) = 100.3, p<0.001]. The proportion of respondents in Berseba perceiving epistaxis as a symptom of sickness in donkeys, those in Bethanie perceiving lameness and those in Tses perceiving dyspnoea and diaphoresis as symptoms of sickness were greater than expected (3.4%, 28.8% and 3.4%; respectively, p<0.05). Overall, however, the proportion of respondents perceiving lameness as a symptom of sickness in donkeys was significantly greater than those perceiving epistaxis, dyspnoea and diaphoresis and ataxia (45.8%, 5.1%, 23.7% and 25.4%; re-

spectively, p<0.001). The proportions of respondents using Aloe vera, brown sugar, detergent and those using nothing to treat sick donkeys was dependent on the village under study [X²(15, n=177) = 55.86, p<0.001]. The proportion of respondents from Gainhas using A. vera, those from Tses using brown sugar and those from Vaalgras using nothing for the treatment of sick donkeys were greater than expected (16.9%, 1.7% and 6.7%; respectively, p<0.05). Overall, the proportion of respondents using A. vera for treatment of ill donkeys was significantly greater than those using nothing or the other treatment methods (76.3%, 15.2% and 8.5%; respectively, p<0.001).

The perception of the causes of pain in donkeys by respondents was dependent on the village under study [X²(5, n=177) = 48.31, p<0.001]. The proportions of respondents from Bethanie citing beating as a cause of pain and those from Tses and Vaalgras citing castration, ear notching and hot iron branding as a cause of pain in donkeys were greater than expected (28.8%, 5.1% and 11.9%; respectively, p<0.05). Overall, however, the proportion of respondents citing beating as a cause of pain in donkeys were significantly greater than those

Table 6: Summary of the veterinary aspects surrounding donkeys from six villages in Southern Namibia

Category	Berseba (%)	Bethanie (%)	Gainhas (%)	Kutsenhoës (%)	Tses (%)	Vaalgras (%)	Total (%)
Regular veterinary visits							
Negative	15,3	22,0	15,3	3,4	3,4	16,9	76,3 ^a
Affirmative	5,1	10,2	1,7	3,4	1,7	1,7	23,7 ^a
Frequency of veterinary visits							
None	15,3	18,6	15,3	3,4	3,4	16,9	72,9 ^{ab}
Once a year	3,4	5,1	0,0	3,4*	1,6	0,0	13,5 ^a
Twice a year	1,7	8,5*	1,7	0,0	0,0	1,7	13,6 ^b
Frequency of illness in donkeys							
Never	0,0	27,1*	8,5	5,1	1,7	8,5	50,8
Rare	20,3*	5,1	8,5	1,7	3,4	10,2	49,2
Perceived symptoms of illness							
Dyspnoea and coughing	3,4	3,4	5,1	3,4	0,0	3,4	18,6 ^{ab}
Anorexia, poor condition	5,1	5,1	10,2	3,4	5,1*	11,9	40,7 ^a
Skin lesions	11,9	23,7*	1,7	0,0	0,0	3,4	40,7 ^b
Method of treatment of ill donkeys							
Aloe vera	13,6	25,4	16,9*	5,1	3,4	11,9	76,3 ^{abc}
Brown sugar	3,4	0,0	0,0	1,7	1,7*	0,0	6,8 ^{cc}
Detergent	0,0	1,7	0,0	0,0	0,0	0,0	1,7 ^{bd}
Nothing	3,4	5,1	0,0	0,0	0,0	6,7*	15,2 ^{adc}
Perceived causes of pain in donkeys							
Beating	8,5	28,8*	11,9	3,4	0,0	6,8	59,3 ^a
Castration, ear notching and hot iron branding	11,9	3,4	5,1	3,4	5,1*	11,9*	40,7 ^a
Perceived symptoms of pain in donkeys							
Lameness	1,7	28,8*	8,5	3,4	0,0	3,4	45,8 ^{abc}
Epistaxis	3,4*	0,0	0,0	0,0	0,0	1,7	5,1 ^{bdc}
Dyspnoea and Diaphoresis	6,8	3,4	1,7	1,7	3,4*	6,8	23,7 ^{ad}
Ataxia	8,5	0,0	6,8	1,7	1,7	6,8	25,4 ^{cc}
Total	20,3	32,2	16,9	6,8	5,1	18,6	100,0

Total Proportions bearing the same suffix^{abcd} were significantly different since p≤0.05; *Village proportions within same category greater than expected since p≤0.05.

citing castration, ear notching and hot iron branding (59.3% and 40.7%; respectively, $p < 0.01$). The proportional perception of the symptoms of pain in donkeys by respondents was dependent on the village under study [$X^2(10, n=177) = 75.71, p < 0.001$]. The proportion of respondents from Bethanie perceiving skin lesions as a symptom of pain and those from Tses perceiving anorexia and poor body condition as symptoms of pain were greater than expected (23.7% and 5.1%; respectively, $p < 0.05$). Overall, the proportions of respondents perceiving skin lesions and those perceiving anorexia and poor as symptoms of pain were significantly greater than those perceiving dyspnoea and coughing as symptoms of pain in donkeys (40.7%, 40.7% and 18.6%; respectively, $p < 0.001$).

Discussion

Our results show that the majority of respondents were unemployed males over 40 years of age mostly from the Nama tribe with mainly secondary education as well as being members of small families of up to four individuals per household. Most respondents hailed from households from which household members had no formal employment. Those from households with employed members revealed that their relatives were mostly doing menial jobs and earned not more than US\$1000 per annum. Our results are in agreement with several studies which also reported donkeys being owned by adult unemployed poor people living in remote isolated villages^[32,41]. However, the results contradict reports of donkeys being mainly owned and used by uneducated women from hostile environments^[5,11,14]. A study conducted in the NCD of Namibia reported that 70.5% of male-headed and 55% of female-headed households owned and used donkeys^[22].

The results of the current study (Table 2) also revealed that the majority (79.7%) of respondents did not own the donkeys that they used. The average number of donkeys per household was three donkeys (47.5%) and only 35.6% of the respondents owned 6 to 20 donkeys. The high proportions of use but not ownership of donkeys amongst the respondents is suggestive of the donkeys being hired or borrowed from someone else, which in itself is suggestive of the importance of donkeys in supporting local business transactions. The average figures of 3–20 donkeys per household are in agreement with those from other studies that reported few donkey per household, but contradicts the findings of one study that reported more than 66% of the households owning up to 79 donkeys per household in the NCA of Namibia^[22]. Inheritance was the most common source of donkeys, which is indicative of a depressed market for donkeys. Most (54.2%) respondents valued donkeys from US\$67–US\$100 each. This is higher than the value of between US\$33–37 per male and US\$36–41 per female donkey in the NCA of Namibia^[22].

About 78% of the respondents did not provide housing and 71.2% did not provide supplementary feeding to their donkeys. Of the respondents who bought feed for their donkeys, about 47.2% spent more than US\$13 weekly on donkey feed. About 67% of the respondents did not provide drinking water for donkeys at the house but allowed them access to designated communal water points. Although donkeys have evolved in geographical locations with limited water and feed (Rossel, 2008)

while surviving on grazing alone because they lose less water through sweat, faeces and urine (Burden, 2012), supplementary feeding is necessary for donkeys providing draught power because of limited time available for grazing. During the dry season, especially in the semi-desert to desert conditions prevailing in the //Kharas region and in drought years, supplementary feeding and provision of water to donkeys is as necessary as it is in other livestock species in order to promote their welfare. Poor husbandry practices such as failure to provide donkeys with shelter (Khan et al., 2013), feed and water^[28,29,39,40] severely compromise the welfare of donkeys and have been reported widely in poor rural and peri-urban communities like //Kharas. Though the NCA farmers reportedly provided shelter for donkeys at night^[22], they did not provide supplementary feeding for their donkeys. Farmers in the NCA's kraaled donkeys during the rainy season to prevent them from destroying crops, keeping them close enough for provision of draught power as and when it was needed. This sutured animal safety and inadvertently reduced the incidence of night-time road traffic accidents involving donkeys.

Donkey meat was highly prized by residents of the //Kharas region with 62.7% preferring donkey to other meats and 42.4% preferring meat from healthy donkeys in good body condition. In terms of slaughter, the majority (76.3%) of respondents used jugular exsanguination as a method of slaughtering donkeys, a method that can cause significant pain and suffering before death.

The results of the current study are in stark contrast to the findings of some studies that suggested that donkeys are mainly kept for work rather than for meat^[1,40]. According to Mudamburi et al., (2003), only 13% of the respondents in the NCA of Namibia considered donkey meat as an important source of proteins in human diets though this was not true in other communities which highly prized donkeys for their meat^[20,46]. Previous studies from Namibia and neighbouring countries reported that donkeys are mostly used for household chores such as fetching water, firewood, transporting expectant mothers and new-born babies and sick household members from remote villages to hospitals and elderly persons to collect their pensions at service centres^[21,22]. Donkeys also reportedly play an invaluable role in tillage, weeding, harvesting and hauling farm produce to markets and merchandise from the roadside to rural shops^[19,22]. Apart from their ability to survive with limited water and feed^[24] the donkey has less subcutaneous fat, and this facilitates body heat loss and efficient thermoregulation.

The majority of respondents (81.3%) were dependent on donkey transport as they claimed not to own alternative mechanised means of transport and 39% claimed spending more than NAD100 for travel to the nearest town by taxi. In fact, 49.2% travelled journeys 30 to 50 km by donkey and at least 81.4% took at least one donkey journey per week. Most respondents (35.6%) preferred to use strong donkeys with good body condition and 30.5% preferred to use alert and active donkeys for draught power. About 61% of the respondents reported that they would not use old, diseased donkeys with poor body condition for draught power.

About 83.1% of the respondents were in support of the donkey skin trade. Proposals to venture into donkey abattoirs for processing of skins destined for the lucrative Chinese market died a still birth in Namibia due to fears of decimation of don-

key numbers and anticipated welfare concerns by animal rights groups^[49]. It has been argued that donkey abattoirs are an unsustainable business proposal due to the current low numbers of donkeys in Namibia coupled with their low reproductive capacity (characterized by low fertility and long gestation periods). Mudamburi et al. (2003) proposed that the abattoirs could only be sustainable if importation of live animals from neighbouring countries for slaughter was made possible. According to Alex Meyer of Donkey sanctuary, “it will take only 4 years to wipe the entire population of Namibian Donkeys” if donkey abattoirs were allowed to operate in the country. In South Africa, the North West Province recently issued a media statement of its intention to promote economic activities through promotion of donkey production and establishment of donkey abattoirs for the export of skins and meat to the Chinese market^[50].

The majority of respondents (76.3%) did not receive regular visits or seek treatment for their donkeys from veterinary/para-veterinary personnel. About 50.8% reported that they had not seen disease in their donkeys, whilst 49.2% reported rare occurrence of disease in donkeys. Anorexia/poor body condition (40.7%), skin lesions (40.7%) and dyspnoea and coughing (18.6%) were the main clinical signs of disease observed by the respondents in donkeys. Most respondents (76.3%) used ethno-veterinary medicine (*Aloe vera*) to treat diseased donkeys, whilst 52% indicated that they slaughter sick donkeys to provide meat for human consumption, which may have serious public health implications. However, the need for regular veterinary visits to donkeys cannot be over emphasised, results from this study are in agreement with those of several previous studies reporting that donkeys suffer from a number of infectious and non-infectious health problems. Infections were encountered on wounds^[8,11,28,41]. The observation of anorexia/poor body condition, skin wounds and dyspnoea as major signs of disease in donkeys by farmers may need further investigation even though these perceptions have been previously reported elsewhere to be indicative of animal welfare abuse^[31,39,40,42,51].

It has previously been reported that wounds located on the neck, back are suggestive of poor harnessing^[41], poor saddling technique and even beating whilst working^[12]. Such practices and attitudes are consistent with poor community's characterized by lack of little formal education coupled with misconceptions of pain perception in donkeys suffering from ill health and lacking awareness of animal welfare issues. Animal health and welfare awareness campaigns can only be premised on an animal welfare assessment of the donkey in the region. It is thus not surprising that gastric lesions^[52,53], dental problems^[3,9] and nutritional diseases^[54] were not particularly deemed important indicators of ill health by farmers in this current study.

The main causes of pain inflicted on donkeys were identified as beating (59.3%), castration/ear notching/hot iron branding (40.7%) and lameness (45.8%). The often observed diminished behavioural responses of donkeys to pain^[43,55] and the accompanying owner assertions that donkeys are stupid, stubborn and insensitive to pain do not bode well with prospects of improving donkey welfare. Such practices and beliefs make donkeys vulnerable to infectious diseases such as tetanus that can be introduced via small wounds from castration/ear notching/hot iron branding and foot lesions from tethering or hobbling.

Unfortunately, the stubborn and nonchalant disposition

of donkeys have led to serious carnage as a result of donkey related road accidents on Namibian roads^[22]. Although welfare conditions reported in this study were somewhat better than those in the NCA of Namibia, these conditions still fall short of guaranteeing the five freedoms at all times to donkeys.

Empirical observations in preliminary studies by colleagues from University of Namibia School of Veterinary medicine have reported several species of ticks and helminth eggs and metacestode segments in faeces of donkeys from the same region (Kahler, unpublished information). The abundance of literature on parasitic diseases of donkeys including ectoparasites^[13,46], endoparasites, particularly, metazoan^[16,45,56] and protozoan parasites^[32,39] suggests that even though not reported in this study, it is highly likely that the donkeys from the //Kharas region may be equally affected especially in view of the relative absence of veterinary visits. Several of the cited studies have suggested the existence of a balanced state of health between donkeys and the parasites living off them. It is argued that treatment of such parasites with anthelmintics may offset this balance and increase parasite resistance to parasitic drugs. Strategic treatment using the concept of refugia^[57] may help control donkey parasites. There is a need for further studies cataloguing the whole list of external and internal parasitic infestations that affect donkeys from this region, which, however, may prove difficult due to the low number of visits by veterinary personnel to the region.

Acknowledgements: The authors would like to thank the University of Namibia for providing material and logistical support for this study.

Conflict of Interest: The authors declare no conflict of interest.

Authors Contribution: All authors contributed equally in the development of this manuscript

References

1. Yilmaz, O., Boztepe, S., Ertugrul, M. The Domesticated Donkey : III – Economic Importance , Uncommon Usages , Reproduction Traits , Genetics , Nutrition and Health Care . (2012) Can J Appl Sci 3(2): 320–338.
Pubmed | Crossref | Others
2. Zakari, F.O., Ayo, J.O., Kawu, M.U., et al. The effect of season and meteorological stress factors on behavioural responses and activities of donkeys (Equus Asinus) - A review. (2015) Ann Anim Sci 15(2): 307–321.
Pubmed | Crossref | Others
3. Burden, F. Practical feeding and condition scoring for donkeys and mules. (2012) Equine Vet Educ 24(11): 589–596.
Pubmed | Crossref | Others
4. Burden, F., Thiemann, A. Donkeys are different. (2015) J Equine Vet Sci 35(5): 376–382.
Pubmed | Crossref | Others
5. Fernando, P., Starkey, P. Donkeys and development: socio-economic aspects of donkey use in Africa. In: Donkeys, People and Development a resource book in the Animal Traction Network for Eastern and Southern Africa (ATNESA). (2004) Wageningen 31–44.

- Pubmed | Crossref | Others
6. Smith, D.G., Pearson, R.A. A review of the factors affecting the survival of donkeys in semi-arid regions of sub-Saharan Africa. (2005) *Trop Anim Health Prod* 37: 1–19.
[Pubmed](#) | [Crossref](#) | [Others](#)
 7. Ayele, G., Dinka, A. Study on strongyles and parascaris parasites population in working donkeys of central Shoa, Ethiopia. (2010) *Livest Res Rural Dev*.
[Pubmed](#) | [Crossref](#) | [Others](#)
 8. Barrandeguy ME, Carossino M. Infectious Diseases in Donkeys and Mules: An Overview and Update. (2018) *J Equine Vet Sci* 65: 98–105.
[Pubmed](#) | [Crossref](#) | [Others](#)
 9. Morrow, L.D., Smith, K.C., Piercy, R.J., et al. Retrospective Analysis of Post-Mortem Findings in 1,444 Aged Donkeys. (2011) *J Comp Pathol* 144(2–3): 145–156.
[Pubmed](#) | [Crossref](#) | [Others](#)
 10. Tadich-Gallo, T.A., De-Aluja, A., Cagigas, R., et al. Children’s recognition of working donkeys’ needs in Tuliman, Mexico: Preliminary observations. (2016) *Vet Mex OA* 3(4).
[Pubmed](#) | [Crossref](#) | [Others](#)
 11. Tesfaye, S., Deressa, B., Teshome, E. Study on the Health and Welfare of Working Donkeys in Mirab Abaya District, Southern Ethiopia. (2016) *Acad J Anim Dis* 5(2): 40–52.
[Pubmed](#) | [Crossref](#) | [Others](#)
 12. Genetu, H., Yohannes, G., Abdela, N., et al. Prevalence of Wounds and Associated Risk Factors in Working Equines in Jimma Town of Oromia Region, South-Western Ethiopia. (2017) *Acad J Anim Dis* 6(2): 23–29.
[Pubmed](#) | [Crossref](#) | [Others](#)
 13. Aragaw, K., Abdella, A., Fekadu, A., et al. Skin associated problems in working donkeys in three districts of Sidama Zone, Southern Ethiopia. (2016) *Ethiop Vet J* 20(2): 99–118.
[Pubmed](#) | [Crossref](#) | [Others](#)
 14. Avorny, F.K., Teye, G.A., Bukari, D., et al. Contribution of donkeys to household food security: a case study in the Bawku Municipality of the Upper East Region of Ghana. (2015) *Ghana J Sci Technol Dev* 3(1): 15–24.
[Pubmed](#) | [Crossref](#) | [Others](#)
 15. McLean, A.K., Heleski, C.R., Yokoyama, M.T., et al. Improving working donkey (*Equus asinus*) welfare and management in Mali, West Africa. (2012) *J Vet Behav Clin Appl Res* 7(3): 123–134.
[Pubmed](#) | [Crossref](#) | [Others](#)
 16. Mohammed, J.S., Rabana, L.J., Bello, M.A., et al. Risk Factors Associated with the Occurrence of Gastrointestinal Helminths among Indigenous Donkeys (*Equus asinus*) in Northeastern Nigeria. (2016) *Scientifica (Cairo)* 2016: 3735210.
[Pubmed](#) | [Crossref](#) | [Others](#)
 17. Olaifa, F.H., Ayo, J.O., Aluwong, T., et al. Ergonomic study of donkeys administered with Pycnogenol® and subjected to packing during the hot-dry season in Northern Nigeria. (2019) *Trop Anim Health Prod* 51(2): 389–394.
[Pubmed](#) | [Crossref](#) | [Others](#)
 18. Swai, E.S., Bwanga, S.J.R. Donkey keeping in northern Tanzania: socio-economic roles and reported husbandry and health constraints. (2008) *Livest Res Rural Dev* 20(5).
[Pubmed](#) | [Crossref](#) | [Others](#)
 19. Starkey P. Donkeys in South Africa: Myths and Misconceptions. (1995) *Anim Tract South Africa Empower Rural Communities* 139–151.
[Pubmed](#) | [Crossref](#) | [Others](#)
 20. Geiger, M., Hovorka, A.J. Using physical and emotional parameters to assess donkey welfare in Botswana. (2015) *Vet Rec Open* 2(1): 1–7.
[Pubmed](#) | [Crossref](#) | [Others](#)
 21. Marufu, M. Socio-economic importance, health and welfare aspects of donkeys (*Equus asinus*) used for carting in a peri-urban area of South Africa. (2014) University of Fort Hare.
[Pubmed](#) | [Crossref](#) | [Others](#)
 22. Mudamburi, B., Chigariro, J., Namalambo, E.S., et al. Donkey population and management for utility in relationship to environmental degradation and traffic accidents in north central Namibia. (2003) Windhoek, Namibia.
[Pubmed](#) | [Crossref](#) | [Others](#)
 23. Matthys, D. British animal welfare organisation concerned over donkey skin trade. (2017) *Namibia Economist*.
[Pubmed](#) | [Crossref](#) | [Others](#)
 24. Rossel, S., Marshall, F., Peters, J., et al. Domestication of the donkey: Timing, processes, and indicators. (2008) *PNAS* 105(10): 3715–3720.
[Pubmed](#) | [Crossref](#) | [Others](#)
 25. Galindo, F., de Aluja, A., Cagigas, R., et al. Application of the Hands-On Donkey Tool for Assessing the Welfare of Working Equids at Tuliman, Mexico. (2018) *J Appl Anim Welf Sci* 21(1): 93–100.
[Pubmed](#) | [Crossref](#) | [Others](#)
 26. Luna, D., Vásquez, R.A., Rojas, M., et al. Welfare status of working horses and owners’ perceptions of their animals. (2017) *Animals* 7(8): 1–15.
[Pubmed](#) | [Crossref](#) | [Others](#)
 27. Pritchard, J.C., Lindberg, A.C., Main, D.C., et al. Assessment of the welfare of working horses, mules and donkeys, using health and behaviour parameters. (2005) *Prev Vet Med* 69(3–4): 265–283.
[Pubmed](#) | [Crossref](#) | [Others](#)
 28. Chaburte, C., Endabu, B., Getahun, F., et al. Health and welfare problems of pack donkeys and cart horses in and around Holeta town, Walmara district, Central Ethiopia. (2019) *J Vet Med Anim Heal* 11(1): 17–25.
[Pubmed](#) | [Crossref](#) | [Others](#)
 29. Hiko, A., Gebremariam, K. Bulletin of Animal Health and Production in Africa. (2017) *Bull Anim Heal Prod Africa* 65(1): 181–189.
[Pubmed](#) | [Crossref](#) | [Others](#)
 30. Pritchard, J., Upjohn, M., Hirson, T. Improving working equine welfare in ‘hard-win’ situations, where gains are difficult, expensive or marginal. (2018) *PLoS One* 13(2): 1–16.
[Pubmed](#) | [Crossref](#) | [Others](#)
 31. Burn, C.C., Dennison, T.L., Whay, H.R. Environmental and demographic risk factors for poor welfare in working horses, donkeys and mules in developing countries. (2010) *Vet J* 186(3): 385–392.
[Pubmed](#) | [Crossref](#) | [Others](#)
 32. Khan, M.S., Ghias, M., Shah, U., et al. Donkey traction, use and welfare needs at Daman region of Dera Ismail Khan, Pakistan. (2013) *Sci Res Essays* 8(21): 823–827.
[Pubmed](#) | [Crossref](#) | [Others](#)
 33. Singh, M.K., Gupta, A.K., Yadav, M.P. The donkey: its role and the scope for better management. (2005) *Livest In* 9(2): 18–20.
[Pubmed](#) | [Crossref](#) | [Others](#)
 34. Tesfaye, A., Curran, M.M. A longitudinal survey of market don-

- keys in Ethiopia. (2005) *Trop Anim Health Prod* 37: 87–100.
[Pubmed](#) | [Crossref](#) | [Others](#)
35. Sánchez-Casanova, R.E., Masri-Daba, M., Alonso-Díaz, M.Á., et al. Prevalence of cutaneous pathological conditions and factors associated with the presence of skin wounds in working equids in tropical regions of Veracruz, Mexico. (2014) *Trop Anim Health Prod* 46(3): 555–561.
[Pubmed](#) | [Crossref](#) | [Others](#)
36. Blakeway, S. The Multi-dimensional Donkey in Landscapes of Donkey-Human Interaction. (2014) *ReBeyond Anthr* 2(2014): 59.
[Pubmed](#) | [Crossref](#) | [Others](#)
37. Mansueto, P., Iacono, G., Taormina, G., et al. Ass's milk in allergy to cow's milk protein: a review. (2013) *Acta Medica Mediterr* 29: 153–160.
[Pubmed](#) | [Crossref](#) | [Others](#)
38. Kandiwa, E., Mushonga, B., Samkange, A., et al. Retrospective study on small ruminants losses in a farm of Namibia. (2018) *Indian J Small Ruminants* 24(1): 115–120.
[Pubmed](#) | [Crossref](#) | [Others](#)
39. Amante, M., Hunde, A., Endebe, B., et al. Health and Welfare Assessment of Working Equine in and Around Nekemte Town, East Wollega Zone, Ethiopia. (2014) *Am J Sci Res* 9(6): 163–174.
[Pubmed](#) | [Crossref](#) | [Others](#)
40. Pearson, R.A., Kreckek, R.C. Delivery of health and husbandry improvements to working animals in Africa. (2006) *Trop Anim Health Prod* 38(2): 93–101.
[Pubmed](#) | [Crossref](#) | [Others](#)
41. Herago, T., Megersa, M., Niguse, A., et al. Assessment on Working Donkey Welfare Issue in Wolaita Soddo Zuria District, Southern Ethiopia. (2015) *Glob Vet* 14(6): 867–875.
[Pubmed](#) | [Crossref](#) | [Others](#)
42. Fсахaye, S., Kumar, N., Kebede, E., et al. Health and welfare assessment of working donkeys in and around Rama town, Tigray, Ethiopia. (2018) *Ethiop Vet J* 22(1): 26–39.
[Pubmed](#) | [Crossref](#) | [Others](#)
43. Grint, N.J., Murrell, J.C., Whay, H.R. Investigating the opinions of donkey owners and veterinary surgeons towards pain and analgesia in donkeys. (2015) *Equine Vet Educ* 27(7): 365–371.
[Pubmed](#) | [Crossref](#) | [Others](#)
44. Passantino, A. Welfare issues of donkey (*Equus asinus*): a checklist based on the five freedoms. (2011) *J für Verbraucherschutz und Leb* 6(2): 215–21.
[Pubmed](#) | [Crossref](#) | [Others](#)
45. Matthews, J.B., Burden, F.A. Common helminth infections of donkeys and their control in temperate regions. (2013) *Equine Vet Educ* 25(9): 461–467.
[Pubmed](#) | [Crossref](#) | [Others](#)
46. Wells, D., Kreckek, R.C. Socioeconomic, health and management aspects of working donkeys in Moretele 1, North West Province, South Africa. (2001) *J S Afr Vet Assoc* 72(1): 37–43.
[Pubmed](#) | [Crossref](#) | [Others](#)
47. Rohde, R.F., Hoffman, M.T. The historical ecology of Namibian rangelands: Vegetation change since 1876 in response to local and global drivers. (2012) *Sci Total Environ* 416: 276–288. Available from:
[Pubmed](#) | [Crossref](#) | [Others](#)
48. Daniel, W.W. *Biostatistics: A Foundation for Analysis in the Health Sciences*. 7th ed. (1999) New York: John Wiley & Sons 141–142.
[Pubmed](#) | [Crossref](#) | [Others](#)
49. Pinehas, T. No to donkey abattoirs. (2017) *The Namibian* 12: 6.
[Pubmed](#) | [Crossref](#) | [Others](#)
50. Moleko, B. Its' all Systems go for Donkey Production and Trade [Internet]. (2017) Media Statement. Mmabatho, Republic of South Africa
[Pubmed](#) | [Crossref](#) | [Others](#)
51. Regan (nee Ashley) FH, Hockenhull J, Pritchard JC, Whay HR. Clinical abnormalities in working donkeys and their associations with behaviour. (2015) *Vet Rec Open* 2(e000105): 1–11.
[Pubmed](#) | [Crossref](#) | [Others](#)
52. Al-Mokaddem, A.K., Ahmed, K.A., Doghaim, R.E. Pathology of gastric lesions in donkeys : A preliminary study. (2015) *Equine Vet J* 47(6): 684–688.
[Pubmed](#) | [Crossref](#) | [Others](#)
53. Sandin, A., Skidell, J., Häggström, J., et al. Postmortem findings of gastric ulcers in Swedish horses older than age one year: A retrospective study of 3715 horses (1924-1996). (2000) *Equine Vet J* 32(1): 36–42.
[Pubmed](#) | [Crossref](#) | [Others](#)
54. Ashinde, A., Gashaw, A., Abdela, N. Health and welfare status of donkeys in and around Hawassa Town, Southern Ethiopia. (2017) *J Vet Med Anim Heal* 9(11): 300–312.
[Pubmed](#) | [Crossref](#) | [Others](#)
55. Grint, N.J., Beths, T., Jean, K.Y., et al. Analysis of Behaviors Observed During Mechanical Nociceptive Threshold Testing in Donkeys and Horses. (2017) *J Equine Vet Sci* 50(2017): 102–109.
[Pubmed](#) | [Crossref](#) | [Others](#)
56. Getachew, M., Trawford, A., Feseha, G., et al. Gastrointestinal parasites of working donkeys of Ethiopia. (2010) *Trop Anim Health Prod* 42(1): 27–33.
[Pubmed](#) | [Crossref](#) | [Others](#)
57. Mushonga, B., Habumugisha, D., Kandiwa, E., et al. Prevalence of *Haemonchus contortus* Infections in Sheep and Goats in Nyagatare District, Rwanda. (2018) *J Vet Med* 2018(9).
[Pubmed](#) | [Crossref](#) | [Other](#)

Submit your manuscript to Ommega Publishers and we will help you at every step:

- We accept pre-submission inquiries
- Our selector tool helps you to find the most relevant journal
- We provide round the clock customer support
- Convenient online submission
- Thorough peer review
- Inclusion in all major indexing services
- Maximum visibility for your research

Submit your manuscript at



<https://www.omegaonline.org/submit-manuscript>