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Assessing donkey health and welfare, and donkey owners' knowledge on donkey welfare in the East Mamprusi Municipal, North-East Region, Ghana

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Abstract

Introduction: *donkeys are vital assets in low-income communities, offering affordable and resilient labour for transportation and agriculture, particularly in arid and semi-arid regions. In East Mamprusi Municipality, where donkey rearing and use for labour are prevalent, welfare challenges remain a concern.* ***Methods:*** *this cross-sectional study, conducted from May to September 2024 in East Mamprusi Municipality, Ghana, aimed to assess the health and welfare of working donkeys and owners?? knowledge of donkey welfare practices. Data were collected through direct animal-based observations and structured interviews with 80 donkey owners randomly selected from three communities.* ***Results:*** *of the 80 working donkeys examined, approximately 31% suffered from various wounds, 65% had ectoparasite infestations, 11.3% experienced musculoskeletal issues, and 20% had myiasis. Other observed health concerns included hoof abnormalities (3.8%) and eye problems (2.5%). Among the 80 donkey owners assessed regarding animal welfare, about 50% had no formal education, 63.8% were unaware of animal welfare principles, and 67.5% were unfamiliar with the Five Freedoms.* ***Conclusion:*** *the practice of beating working animals was notably prevalent (33.7%). Moreover, 12.5% of owners did not provide rest for sick or injured donkeys, and 27.5% did not retire their ageing donkeys, further indicating health and welfare challenges. Enhancing owner awareness through veterinary support, mass education, training, and extension services is critical to improving donkey welfare and care in the region.*

Introduction

Donkeys are indispensable assets in many low-income communities, providing affordable, docile, and easily trainable labour for transportation and agriculture in many developing countries [1]. Their resilience to drought and ability to consume low-quality forage with minimal feed and water requirements make them particularly valuable in arid and semi-arid regions [2]. Domesticated approximately 6,000 years ago, donkeys (*Equus asinus*) have significantly influenced transport and early societies in Africa and Asia [3]. In northern Ghana, donkeys play a crucial role in agricultural practices, such as transporting compost to fields and assisting with plowing [4]. Beyond their agrarian use, donkeys are also employed to transport passengers, firewood, water, and goods to markets and households in the region, impacting livelihoods in diverse ways [5,6].

Despite their invaluable contributions to livelihoods, donkeys remain one of the most neglected animals globally, often regarded as low-status and undervalued [7,2]. Ownership is frequently tied to low-income individuals who are unable to meet the animals´ basic needs [8]. As a result, donkeys often endure long hours of labour under harsh conditions and poor feeding, leading to compromised health and welfare [9]. Unlike horses, donkeys are seldom provided with feed supplements or veterinary care, and they face persistent challenges from diseases, which further compromise their productivity and performance [10]. Several studies have underscored their vulnerability to a wide range of health and welfare problems, including poor body condition scores, gait abnormalities, joint swelling, skin injuries, parasitic infestations, and dental issues [7,9,11-13]. Additionally, the rising global demand for the widely coveted product, e´jiao, a traditional Chinese medicine derived from donkey hides, also threatens donkey populations worldwide, compounding their burdens despite their vital contributions to livelihoods [6]. Thus,

the mistreatment of donkeys raises significant welfare concerns on a global scale.

Animal welfare involves both the physical and mental well-being of animals and is defined by the Five Freedoms framework: freedom from hunger and thirst, freedom from discomfort, freedom from pain, injury, or disease, freedom to express normal behaviour, and freedom from fear and distress [14]. Adhering to these freedoms not only improves donkeys' quality of life but also their owners' well-being [15,16]. Donkeys are among the most under-researched livestock globally, regardless of their significant local economic contributions and role in reducing gender inequality by alleviating women's burden of onerous activities, particularly in northern Ghana [17]. In the East Mamprusi Municipality, donkey rearing and use for labour are common, which may lead to associated health and welfare issues requiring needed attention. This study aims to provide evidence regarding the poor health and welfare status of working donkeys and the associated socio-economic factors in the area, and recommend solutions.

Methods

Study area: the study was conducted from May to September 2024 in the East Mamprusi Municipality, situated in the North-East Region of Ghana, with Gambaga serving as the capital town. The municipality covers an area of 1660km^2, representing about 2.2% of the region's total landmass (Figure 1). East Mamprusi Municipal ranks 251stout of 261 districts for the percentage of its population living in multidimensional poverty, reflecting one of the highest rates of deprivation in areas such as education, healthcare, and living standards [18]. In the district, 90.6% of households engage in agriculture, with 97.4% in rural areas and 78.7% in urban areas [19]. Most (97.3%) of agricultural activities focus on crop farming [19].

Study design and population: this study employed a cross-sectional design, utilizing both qualitative and quantitative methods to gather data. A total of 80 working donkeys and 80 donkey owners/users were randomly selected from three communities in the East Mamprusi Municipal, comprising 27 donkeys from Gambaga, 27 from Nalerigu, and 26 from Gbangu. The study also assessed the corresponding owners' knowledge regarding animal welfare. Data collection involved both direct animal-based observations and interviews with the owners.

Sampling size determination: the sample size for this study was determined using Taro Yamane's Formula [20]. Yamane's formula is presented as:

$$n = \frac{N}{1 + Ne^2}$$

Where n is the sample size, N is the total population, and e is the sampling error of 0.05 at a 95% confidence interval. Accordingly, N=100 represents the total population of donkeys or donkey owners in the selected area. Therefore: n= 100/ (1+100(0.05)2) = 80. Thus, using a simple random sampling strategy, 80 people made up the sample size for this study.

Data collection: both open and closed-ended pre-tested structured questionnaires were used to collect quantitative or qualitative data from the respondents. The questionnaires were adapted from a similar study in Hargeisa City, Somaliland by Hussein Mohamed *et al*. [21]. Data was collected using structured interviews with donkey owners and also through physical examination of working donkeys to assess their general health indicators. Data collection was facilitated using Kobo Collect forms. The questionnaires were initially developed in English and later translated into the local language, Mampruli, to enhance respondent comprehension.

Data management and analysis: initial data were entered into Microsoft Excel 2016 and cleaned

before exporting to Statistical Package for Social Sciences (SPSS) Version 20 for analysis. The results are presented in tables, bar charts, and pie charts generated using Microsoft Word 2016 and Microsoft Excel 2016.

Body condition scoring (BCS): the body condition of the working donkeys was assessed and scored using Donkey Sanctuary's Body Condition Scoring System [22]. The BCS scale ranged from 1 (poor), indicating extreme thinness with visible ribs and minimal fat cover, to 5 (obese), characterized by excessive fat deposits and non-palpable ribs and spine. Intermediate scores included BCS 2 (thin), BCS 3 (ideal), and BCS 4 (fat).

The overall animal welfare knowledge scoring for the respondents: respondents´ knowledge of animal welfare was evaluated using a structured questionnaire covering awareness, education sources, and understanding of the Five Freedoms. A total of 28 key parameters were scored from 0 to 3 or 0 to 2 for multiple-choice questions, while "yes/no" responses were scored 1 (correct) or 0 (incorrect). The maximum score was 39, categorized in terms of percentage as low (0%-49%), moderate (50%-74%), or high knowledge (75%-100%). This scoring system was adapted from Sommerville *et al*. and Islam *et al.* [23,24].

Overall donkey health status scoring: donkey health was assessed through physical examination of skin, hooves, eyes, nose, teeth, hair coat, ectoparasites, wounds, and other health indicators. Each parameter was scored as 0 (abnormality present) or 1 (absent), with a total possible score of 18. Health status was categorized as poor (0%-50%), average (51%-80%), or good (81%-100%) [23,25].

Overall donkey welfare scoring: donkey welfare was evaluated based on BCS, feeding frequency, use of padding, watering, housing, veterinary access, traditional medicine use, fatigue management, and behavioral responses. Each parameter was scored 0-3 (accuracy-based) or 0-1 (yes/no format). Welfare scores, out of 45 points, were classified as poor (0%-50%), average (51%-80%), or good (81%-100%) [26,27].

Ethics statement: ethical approval for the study was obtained from the Veterinary Services Directorate of the North East Region, dated 05/01/24, with reference number MOFA/VSD/NER/SRA/23/10/02.

Results

Demographic characteristics: from the characteristics, 90% (n=72) were male, and 10% (n=8) were female, out of the 80 respondents. Educational levels varied, with 50% (n=40) having no formal education, while 28.8% (n=23) completed primary school, 16.3% (n=13) secondary school, and 5% (n=4) tertiary education. Religiously, 75% (n=60) were Muslim, 18.8% (n=15) Christian, and 6.3% (n=5) practised traditional religions. Respondents were distributed across Gambaga (33.8%, n=27), Nalerigu (33.8%, n=27), and Gbangu (32.4%, n=26). Most of the donkeys (60%) were female, with body weights primarily ranging between 151-200 kg (43.8%) and over 201 kg (40%). Most owners had one or two donkeys (66.3%), while fewer owned three or more. All donkeys were used as drought animals, performing tasks such as transporting water, firewood, sand, manure, and farm produce with carts.

Age distribution of donkeys: most of the donkeys (37) were between the ages of 6 and 10, 16 of them were more than 11 years old, and 27 were less than 5 years old.

The respondent's knowledge on animal welfare and the 5 animal freedoms (n=80): Table 1 summarizes respondents´ knowledge and practices regarding animal welfare and the five animal freedoms. Only 36.3% (n=29) had received animal welfare education, primarily from veterinarians (28.8%), while 63.8% (n=51) had no such education. Awareness of the five freedoms was limited, with 32.5% (n=26) knowledgeable and 67.5% (n=54) unaware. Knowledge and practice of

specific freedoms varied. Freedom from thirst and hunger had the highest awareness (57.7%) and compliance (96.3%), while freedom from injury and disease was understood by 30.7% and practised by 35%. Freedom from pain and discomfort was poorly understood (7.7%) and practised by only 11.3%. Similarly, the freedom to express normal behaviour was minimally understood (3.8%) and practiced (11.3%). The freedom to have enough space was the least recognized (0%) and least practiced (7.5%).

Overall knowledge score on donkey welfare among the respondents: the majority (77.5%, n=62) demonstrated moderate knowledge, while 21.25% (n=17) had low knowledge, and only 1.25% (n=1) exhibited high knowledge.

Assessment of the health status of working donkeys (n=80): the health status of 80 working donkeys was assessed through physical examinations focusing on parameters such as skin, hooves, eyes, teeth, ectoparasites, and other health indicators (Table 2). Skin lesions were found in 38.8% (n=31) of the donkeys, with 13.8% (n=11) having back lesions, 11.3% (n=9) leg lesions, 5% (n=4) neck lesions, 5% (n=4) tail lesions, and 3.8% (n=3) bite lesions. However, 61.3% (n=49) exhibited no lesions. Wounds were recorded in 38.8% (n=31) of donkeys, with 15% (n=12) having one wound, another 15% (n=12) having two, 7.5% (n=6) having three, and 1.3% (n=1) having four or more. Hoof abnormalities were rare, affecting only 3.8% (n=3) of donkeys, while musculoskeletal issues were seen in 11.3% (n=9). Eye abnormalities were observed in 2.5% (n=2), but no dental, nasal, or hair coat abnormalities were noted. Ectoparasites, such as ticks and flies, were present in 65% (n=52) of the donkeys, while 28.7% (n=23) had visible faecal worms, and 20% (n=16) had myiasis (maggots or larvae beneath the skin). No nasal, vaginal, or urethral discharges were detected. The overall health status of the 80 donkeys, as evaluated through physical examination in Table 2, was further grouped into Poor Health, Moderate Health, and Good Health (Figure 2). The majority, 57.5% (n = 46), were in good health, 41.25% (n = 33) were in moderate health, and only 1.25% (n= 1) were in poor health.

Assessment of working donkeys´ welfare (n=80): the welfare of 80 working donkeys was assessed based on parameters including health and veterinary care indicators (Table 3), feeding and maintenance practices, and work-related welfare conditions.

Health and veterinary care indicators: the body condition scores ranged from poor (BCS 1) to good (BCS 3), with the majority (65%, n=52) classified as average. Veterinary care was sought for sick donkeys by 83.8% of owners, while others relied on traditional medicine (10%) or provided minimal care themselves (3.8%). Only 28.8% of the donkeys had received vaccinations, and 68.8% of owners reported having easy access to veterinary services. Nearly all owners (98.8%) acknowledged that donkeys experience pain (Table 3).

Feeding and maintenance practices: feeding frequency varied, with most owners (58.75%) feeding their donkeys more than three times daily, while 5% provided only one meal per day. The majority (78.8%) provided more than 2 kg of feed daily, primarily consisting of dry grass (45.1%) and fodder (46.3%), with minimal supplementation (6.3%). Watering frequency also varied, with only 15% of donkeys having constant access to water. Routine care was limited, as 85% of owners never trimmed their donkeys´ hooves, and 82.5% never bathed them.

Work-related welfare and handling: shelter at night was available for 56.3% of donkeys, but only 2.5% were housed in stables during the dry season. The donkeys typically worked 4 hours per day (63.8%), with a minority working over 8 hours. Most donkeys began working at three years of age (72.5%). When donkeys slowed or stopped, 53.8% of owners allowed them to rest, while 33.7% resorted to beating. Retirement was common (72.5%), with retired donkeys either sold (57.4%) or kept and fed (37.5%). While 87.5% of owners refrained from using sick or injured donkeys for

work, 12.5% did. Pregnant jennies were used for work by 26.3% of owners. Despite the universal use of padding materials for harnessing, harness-related injuries were still reported. Behavioral assessments indicated that 81.3% of donkeys did not exhibit aggression such as kicking or biting.

Donkey harness and padding types: the most used donkey harness and padding type was the car tyre-made harness with foam padding, utilized by 70% (n= 56) of the respondents. The second most popular choice was the car tyre-made harness with cotton pillow padding material, employed by 16.25% (n = 13) of the respondents. Other types of harnesses and padding materials used included car tyre harnesses with grass pillow padding, leather-made harnesses with grass pillow padding, and leather-made harnesses with foam padding, accounting for 6.25%, 3.75%, and 3.75% of the respondents, respectively. The overall welfare status of the donkeys (n=80) was categorized into three distinct groups: poor, average, and good welfare. The majority, 81.25% (n=65), of the donkeys fell within the average or moderate welfare category, 15% (n=12) were within the good welfare category, and 3.75% (n=3) were within the poor welfare category (Figure 3).

Discussion

In developing countries, impoverished communities rely heavily on donkeys for livelihood and income generation. This study provides insight into the demographic characteristics of donkey ownership, along with welfare and management practices in the East Mamprusi municipality, highlighting notable health issues for donkeys and critical concerns regarding adherence to animal welfare standards for donkeys. The study found that donkey ownership is predominantly male-dominated (90%), likely due to the physically demanding nature of tasks such as farming and transporting heavy loads. Women who own donkeys primarily use them for water and firewood collection, transporting shea nut seeds to homes, or renting them out for income, a trend also observed by Hussein *et al*. [21] in Somaliland. Ownership was most common among older individuals, with 38.7% aged 42 years and above, followed by 35% between 33 and 42 years, aligning with Herago *et al*. [28] in Ethiopia and Hussein *et al*. [21] in Somaliland, who reported that donkey rearing is primarily undertaken by middle-aged to older adults. Educational attainment among respondents was generally low, with half lacking formal education, reinforcing findings by Koko *et al*. [2] in Sudan that donkey ownership is often associated with individuals in informal labour sectors such as farming and transportation. Among those with some education, many were school dropouts, with only 5% attaining tertiary education, contrasting with Mohamed *et al*. [29], who found that most donkey owners had at least a primary education. Differences in educational levels across regions may suggest variations in access to education among these areas. Most owners (65%) had more than one donkey, a practice that helps mitigate overworking individual animals, aligning with Atieno *et al*. [30] in Kenya. However, Koko *et al*. and Hussein *et al*. [2,21] reported contrasting trends, where most respondents owned only one donkey, potentially increasing the risk of exhaustion and health deterioration due to excessive workloads.

Female donkeys accounted for 60% of the working population, likely due to their reproductive capabilities and placid temperament. Owners typically sell some offspring while retaining one male for work, allowing the mother to rest. This observation contrasts with findings from Koko *et al*., Mohamed *et al*. and Adam *et al*. [2,29,31], which indicated a greater prevalence of male donkeys. All donkeys were used for draught purposes, such as transporting water, firewood, sand, and farm produce, consistent with Herago *et al*. and Ashinde *et al*. [28,32]. While donkeys play a crucial economic role, their heavy reliance on labour raises concerns about overwork and inadequate welfare provisions. Most donkeys were middle-aged (6-10 years), the prime working

age, aligning with Kumar *et al*. and Adam *et al*. [11,31]. Younger donkeys (≤3 years) were occasionally put to work, while older donkeys (≥11 years) were fewer due to reduced working capacity. Older donkeys require specialized care, including lighter workloads and regular veterinary attention, but some are worked until they become too weak.

A significant proportion (63.8%) of respondents lacked knowledge of animal welfare, contributing to poor management practices such as delayed feeding, inadequate medical care, and instances of physical mistreatment. This finding aligns with Koko *et al*. and Herago *et al*. [2,28], who reported that over 90% of respondents had no formal animal welfare education. Among the 36.3% who had received some training, veterinarians were the primary source (28.8%), highlighting their key role in knowledge dissemination. However, alternative sources, such as outreach events and media, played a minor role, emphasizing the urgent need for public education efforts. Awareness of the Five Freedoms was particularly low, with only 32.5% of respondents recognizing them. While 57.7% understood freedom from hunger and thirst, fewer grasped freedom from pain (7.7%) or the freedom to express natural behaviour (3.8%). Notably, no one recognized the need for adequate space for movement. The application of welfare standards was inconsistent. Although 96.3% prioritized providing access to food and water, probably because of the immediate effects caused by hunger and thirst, as highlighted by Badmos *et al*. [13], only 35% focused on preventing injuries and diseases. Freedom from pain was largely neglected (11.3%), and 88.7% failed to provide sufficient space for natural behaviours, leading to psychological stress and behavioural issues. These knowledge gaps may stem from limited access to education, financial constraints, cultural practices that overlook animal welfare, and a lack of formal training. The imbalance between addressing immediate needs (feeding) and long-term well-being (injury prevention, behavioural needs) underscores the need for targeted educational campaigns to enhance donkey welfare awareness and management.

Regarding the overall understanding of animal welfare among respondents, the findings revealed that a majority (77.5%) had moderate knowledge of animal welfare. This suggests that while they possess some awareness, they may lack in-depth understanding or the capability to implement the best practices or effectively address complex welfare issues. A smaller group (21.25%) exhibited low knowledge, indicating a limited grasp of animal welfare principles. Notably, only 1.25% (n=1) demonstrated a high level of comprehension, highlighting the rarity of advanced knowledge in animal welfare within the study area.

Donkeys in the study exhibited various health challenges, including wounds, ectoparasites, and musculoskeletal disorders. Wounds affected 31% of donkeys, with back (13.8%), leg (11.3%), neck (5%), and tail (5%) sores being the most common. Back sores were primarily caused by ill-fitting harnesses, insufficient padding, and shifting or deteriorating padding materials. Neck lesions were similarly linked to poorly fitted harnesses and physical trauma from being struck with a stick, while tail wounds resulted from bites during aggressive interactions. Leg sores were often due to accidental trauma from pulling carts or injuries sustained while grazing on crops. These findings align with Hussein *et al*. and Adam *et al*. [21,31] but report lower wound prevalence compared to Kumar *et al*. and Herago *et al*. [11,28], who documented rates above 50%. Hoof abnormalities (3.8%) and musculoskeletal issues (11.3%) were associated with extreme heat, rough terrain, and overloading. Ectoparasites (65%) were significantly more prevalent than in [28] (12.6%) and [8] (48.4%), indicating poor parasite control. These infestations caused irritation, disrupted feeding, and increased the risk of secondary infections. The presence of faecal worms (28.7%) and myiasis (20%) highlights gaps in preventive healthcare, particularly in deworming and wound management. Additionally, housefly infestations, a

frequently reported concern among owners, were likely exacerbated by the high wound prevalence, as open wounds attract flies, further increasing the risk of infection and discomfort. The persistent irritation from flies forces donkeys to expend energy swatting rather than foraging, potentially leading to malnutrition and other health complications. These findings emphasize the need for improved deworming, wound care, and fly control measures to enhance donkey welfare and productivity.

Overall, 57.5% of donkeys were in good health, 41.3% in moderate condition, and 1.3% in poor health. While the low percentage of severely ill donkeys is reassuring, the high proportion of moderately healthy ones suggests room for improvement in management practices. Body Condition Scores indicated that 7.6% of donkeys were underweight, likely due to nutritional deficiencies, underlying health issues, or both. The majority, 65%, had a BCS of 2, signifying an average body condition, while 27.5% of the donkeys had a BCS of 3, reflecting good body condition. This contrasts with the findings by Aliye *et al*. [33]. Those with an average body condition seem to be receiving sufficient care and nutrition to maintain them at an acceptable level, though not at optimal health, while those with good body conditions likely benefit from appropriate nutrition and care.

Most owners (83.8%) sought veterinary care when their donkeys fell sick, while 10% relied on traditional remedies, including diesel, car engine oil, shea butter, ash, and groundnut oil for wound care and fly repelling. Access to veterinary services was reported as easy by 68.8% of respondents, whereas 31.3% faced difficulties, leading to reliance on traditional healers or self-medication. For tick infestations, some owners used boiled local leaves ("Daborikuka") or mahogany tree roots, applied orally or topically, while groundnut oil was sometimes used for deworming. A smaller proportion (2.5%) provided no medical intervention, leaving their donkeys to recover naturally. Although traditional treatments are common in rural communities, reliance on them without veterinary consultation may delay appropriate care and worsen health outcomes. These findings align with Hussein *et al*., Mohamed *et al*. and Ashinde *et al.* [21,29,32], who similarly reported limited veterinary access and dependence on traditional medicine. This underscores the need to improve veterinary services to ensure timely and effective donkey healthcare.

This study found that many donkey owners do not trim their donkeys' hooves, even when they become overgrown, which can lead to trauma, thrush, and other hoof diseases. This finding is consistent with a study by Mohamed *et al*. [29] in the Benadir Region, where 78.9% of owners did not trim hooves. Although 98.8% of owners acknowledge that donkeys experience pain, only 11.25% practice measures to alleviate pain and discomfort, while 88.75% do not, which is concerning. Regarding feeding, 58.75% of owners fed their donkeys more than three times daily, 27.5% fed them three times, 8.8% twice, and 5% once. This distribution aligns with the freedom from hunger and thirst, which 57.7% of respondents understood and 96.25% applied correctly, similar to findings by Aliye *et al*. [33]. However, 93.7% did not provide feed supplements, relying on local feeds such as dry grass (45.1%), fodder (46.3%), maize (7.5%), and sorghum straw (1.3%). In terms of quantity, 78.8% of donkeys received more than 2 kg daily, while 21.4% received 2 kg or less. For water access, there was good adherence to freedom from thirst, consistent with Hussein *et al*. [21], who found that 90% of donkey owners watered their animals twice to thrice daily.

Workload assessments revealed that 63.8% of donkeys worked up to four hours daily, while 36.2% exceeded this duration, violating recommended work limits. When donkeys showed signs of fatigue, 53.8% of owners allowed them to rest, but 33.7% resorted to beating, a concerning practice given Ghana´s Criminal Offense Act 1960 (Act 29, Section 303), which prohibits animal

cruelty. However, this proportion is lower than Mohamed *et al*. [29] in the Benadir Region, where 79.7% of owners used physical punishment. Similarly, in rural Ethiopia, many owners considered beating acceptable when donkeys refused to move [8], while Mafukata *et al*. [34] reported widespread donkey abuse in South Africa, particularly among young and adult male owners. Rest practices were inconsistent, with 22.5% of donkeys working daily without breaks, increasing the risk of exhaustion. Additionally, 12.5% of sick or injured donkeys were still used for work, compromising their welfare. Retirement practices were also irregular, as 27.5% of owners continued working on ageing donkeys instead of allowing them to rest. Furthermore, 26.3% of owners used pregnant donkeys (Jennies) for labour, potentially leading to late-term abortion or fetal death, another violation of Ghana´s Criminal Offense Act 1960 (Act 29, Section 303), which criminalizes unnecessary animal suffering.

Shelter provision was inadequate, with 43.7% of donkeys left unsheltered at night and 97.5% lacking housing during the dry season. This left them vulnerable to harsh weather, theft, spurred by the demand for donkey skin in traditional Chinese medicine [35], and predation. Similar trends were reported by Badmos *et al*. [13] and Aliye *et al*. [33], where most donkeys lacked adequate shelter. Hygiene practices were also poor, with 82.5% of owners never bathing their donkeys, believing it unnecessary. This neglect contributes to ectoparasitic infestations and skin infections. Behavioural assessments showed that 18.7% of donkeys displayed avoidance behaviours (kicking, biting, or moving away from humans), likely due to past mistreatment, discomfort, or stress, consistent with Aliye *et al*. [33]. Overall, 81.25% of donkeys had moderate welfare, receiving basic care but lacking optimal conditions. Fifteen percent (15%) had good welfare, benefiting from proper nutrition, health management, and shelter, while 3.75% had poor welfare, suffering from significant deficiencies in nutrition, healthcare, and housing, highlighting a critical welfare concern.

Recommendation

Improving donkey welfare in the East Mamprusi Municipality requires a comprehensive training program on the five freedoms, pain management, and humane handling, complemented by regular awareness campaigns to foster community engagement. For instance, the Traffic Light Auto-Evaluation System, successfully implemented in Goli village, Senegal, has demonstrated the effectiveness of community-led welfare assessments [36]. Using a colour-coded checklist to evaluate hoof quality, body lesions, and behaviour, owners receive red (poor), orange (acceptable), or green (good) scores, fostering accountability and motivation for improvement. Given the welfare challenges in the East Mamprusi Municipality, a similar peer-driven approach could enhance owner awareness, encourage best practices, and promote sustainable improvements in donkey care. Veterinary access must be strengthened through mobile clinics, community animal care centers, and structured parasite control programs to support welfare further. Owners should also be encouraged to use well-fitted harnesses with proper padding to prevent injuries. Additionally, work-hour regulations should be enforced to ensure adequate rest, particularly for older and sick donkeys. Finally, strengthening policy frameworks and enforcing animal welfare standards through education, veterinary support, humane management practices, and legal enforcement will be crucial in securing long-term improvements in donkey health, productivity, and human well-being within the municipality.

Conclusion

This study highlights significant health and welfare challenges working donkeys face in the East Mamprusi Municipality. High incidences of body wounds, ectoparasitic infestations,

musculoskeletal issues, and myiasis indicate critical gaps in health management. Poor welfare was attributed mainly to owners' limited knowledge of animal welfare and the five freedoms, alongside inadequate management practices such as improper harnessing, insufficient padding, poor handling, and inadequate housing. Additionally, restricted access to veterinary services further exacerbates these challenges. While food and water access were relatively well-maintained, other fundamental welfare aspects remain pressing concerns, particularly freedom from injury, pain, and distress. Addressing these issues is essential for improving the well-being of working donkeys in the region.

What is known about this topic

- *Donkeys are among the most under-researched livestock globally;*
- *Donkeys are significantly contributing to the local economy in rural areas;*
- *It also helps in reducing gender inequality by alleviating women's burden of onerous activities, particularly in northern Ghana.*

What this study adds

- *There is a high incidence of body wounds, ectoparasitic infestations, musculoskeletal issues, and myiasis, which indicate critical gaps in donkey health management;*
- *Poor welfare was attributed mainly to owners?? limited knowledge of animal welfare and the five freedoms;*
- *There is restricted access to veterinary services, though food and water access were relatively well-maintained for working donkeys in the region.*

Competing interests

The authors declare no competing interests.

Authors' contributions

The authors of this study contributed to the research in the following manner: Umar Ibrahim and Raphael Deladem Folitse were responsible for conceptualizing the study, designing the methodology, data collection, analyzing the data, and drafting the original manuscript. Emmanuel Opoku Darko, William Tasiame, Tony Opoku-Agyemang and Benjamin Obukowho Emikpe contributed to data analysis, as well as reviewing, and editing the manuscript. All the authors have read and approved the final version of this manuscript.

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Tables and figures

Table 1: assessment of respondents' knowledge on animal welfare (n = 80)

Table 2: overview of the health status of the donkeys in the study area (n=80)

Table 3: welfare status of working donkeys (n=80)

Figure 1: map of East Mamprusi Municipal and the surrounding districts (Ghana Statistical Service, 2014)

Figure 2: overall health status of the donkeys

Figure 3: overall welfare status of the donkeys

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Table 1: assessment of respondents' knowledge on animal welfare (n = 80)

Variable	Response	Frequency	Percentage (%)
Educated on animal welfare	Yes	29	36.3
	No	51	63.8
The education source	From friends	3	10.3
	From radio	2	6.9
	Veterinarians	23	79.3
	World animals' day event	1	3.4
Knowledge on the five animal freedoms	Yes	26	32.5
	No	54	67.5

Table 2: overview of the health status of the donkeys in the study area (n=80)

Variable	Response	Frequency	Percentage
Skin lesions: location of wound	Skin lesion	31	38.8
	No lesion	49	61.3
Endo and ectoparasites observed	Yes	52	65
Ectoparasites (ticks)	No	28	35
Presence of fecal worms	Yes	23	28.7
	No	57	71.3
Maggots or larvae beneath the skin(myiasis)	Yes	16	20
	No	64	80

Table 3: welfare status of working donkeys (n=80)			
Variable	**Response**	**Frequency**	**Percentage (%)**
Body condition score	Poor (BSC1)	6	7.6
	Medium (BSC2)	52	65
	Good (BSC3)	22	27.5
Quantity of feed given per day	2 kilograms	14	17.6
	More than 2 kilograms	63	78.8
	One kilogram	3	3.8
Watering frequency	Constantly available	12	15
	More than twice per day	38	47.5
	Once daily	3	3.8
	Twice daily	27	33.8
Working hours of the donkey in a day	10 and above hours	5	6.2
	4 hours	51	63.8
	5 hours	10	12.5
	6 hours	11	13.8
	8 hours	3	3.8
The working age of a younger donkey	3 years	58	72.5
	4 years	10	12.5
	5 +	4	5.0
	No idea	8	10.0
Donkeys do feel pain	No	1	1.3
	Yes	79	98.8
Donkeys attempt to kick or bite when humans approach	No	65	81.3
	Yes	15	18.7

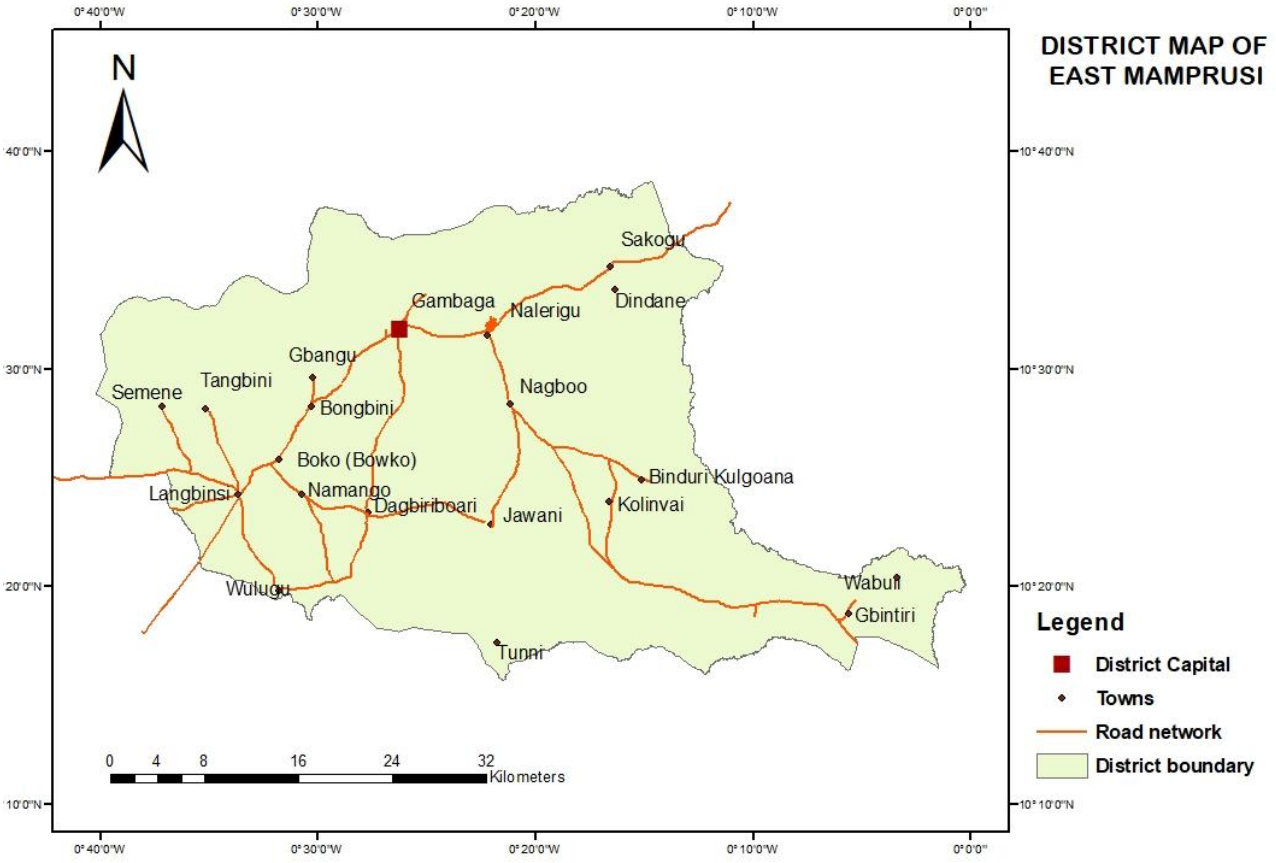

Figure 1: map of East Mamprusi Municipal and the surrounding districts (Ghana Statistical Service, 2014)

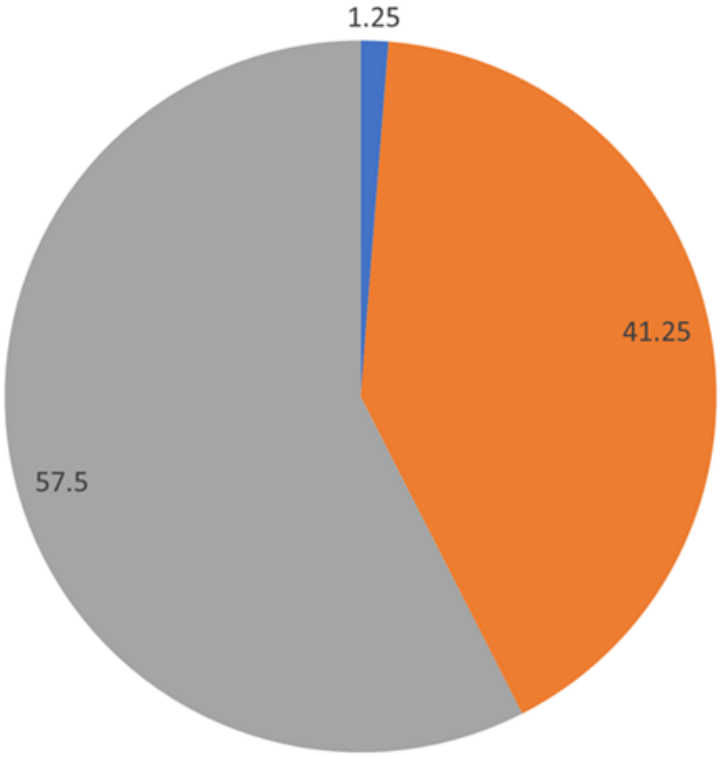

Figure 2: overall health status of the donkeys

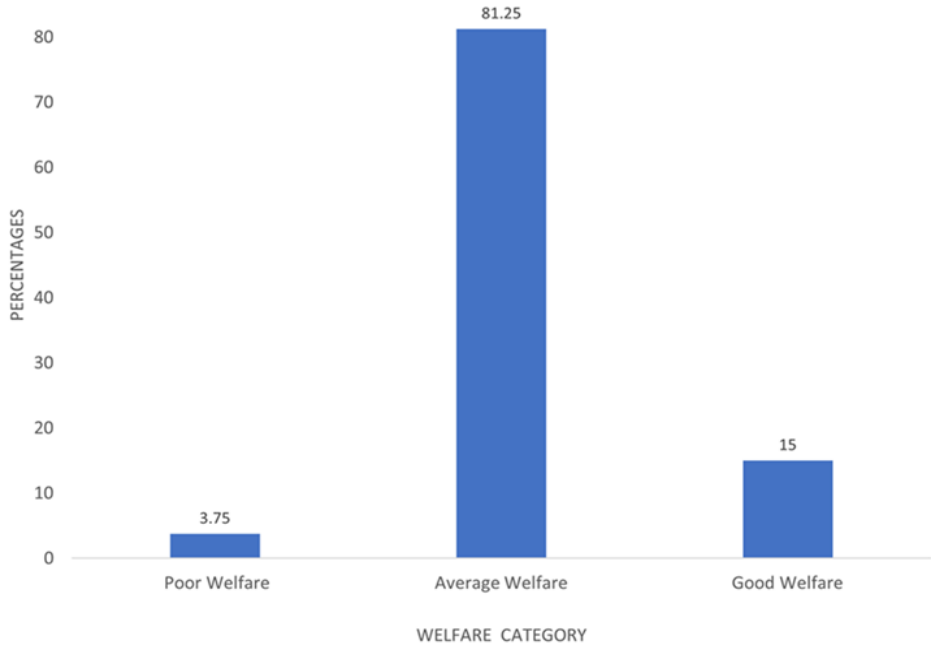

Figure 3: overall welfare status of the donkeys