The socioeconomic impact of health problems of working equids in low- and middle-income countries: A scoping review on the female-gender perspectives

Marta Bonsi1*, Neil E. Anderson1 and Gemma Carder2

Abstract

Working equids provide a crucial contribution to reduce the work burden on women and they protect the livelihoods and food security of female-headed households in low- and middle-income countries (LMICs). Nevertheless, they remain a neglected category within animal health policies and interventions, including those aimed at supporting women, that focus mostly on food production animals. This scoping review aims to assess the existing knowledge on the socioeconomic impact of health problems of working equids in LMICs under a female-gender perspective and to identify research gaps on the subject. The review intends to provide orientation for future research that is required to sensitise policymakers within governments and international organisations in LMICs on the importance of developing programmes for protecting working equids’ health and to incorporate such programmes within interventions supporting women’s empowerment.

Six relevant publications were identified through the search of five databases (CAB Abstracts, Web of Science Core Collection, BIOSIS, EMBASE and Scopus), backward citation searching and screening of indexes of proceedings and special issues retrieved from the database search. No limits were applied to the search strategy. Publications set in LMICs were considered eligible for the review if they included considerations regarding the female-gender perspective on the socioeconomic impact of infectious and non-infectious diseases of working equids or if female participants were included within the study population.

The review findings show that this subject is dramatically under-researched and only one article broadly studied the socioeconomic effects of health problems of working equids on women, while most of the publications included an exiguous number of female participants and made limited considerations on the matter. Considering the complexity of the subject, future research would benefit from the application of the One Health approach that represents an opportunity to clarify the link between equid health, women’s wellbeing and livelihoods, facilitating the translation of research into policy. Further research should focus on the socioeconomic impact of diseases with high morbidity and mortality, especially zoonoses. A participatory approach is recommended to ensure that the community viewpoint is acquired in detail, including indigenous women’s perspectives. The presence of female researchers can ensure that women’s voices are captured thoroughly.

One Health impact statement

By highlighting the implications of working equid diseases on women’s health and wellbeing, animal welfare and environmental health, this study demonstrates that future research on the subject would benefit from the application of a One Health approach. The engagement of a transdisciplinary team of veterinarians, epidemiologists, social scientists and public health specialists besides the incorporation of indigenous knowledge could effectively capture the multiplicity of consequences of the impaired health of working equids on women. This may facilitate the translation of research into policy, resulting potentially in the inclusion of women among beneficiaries of programmes targeting working equids, in an improved consideration of working equids within animal health interventions and within broader programmes targeting women, with long-term benefits on women’s health and wellbeing and animal welfare. Lastly, integrating females’ and indigenous people’s viewpoints in One Health research could enhance the identification of sustainable solutions to tackle the burden of working equid diseases.

Keywords: working equids, One Health, animal health economics, socioeconomic impact, women, female-gender, low- and middle-income countries, scoping review
Introduction

There are around 116 million working equids worldwide among horses, donkeys and mules that represent the source of livelihood for 600 million people in low- and middle-income countries (LMICs) in Africa, Asia, Central and South America and Europe (Brooke, 2022a; Food and Agriculture Organisation (FAO), 2022). Working equids are particularly important to women, especially those who are heads of the household, since they enable them to cover their basic needs by providing draught power and transportation for income-generating activities and domestic purposes (Garuma et al., 2004; Valette, 2015a; b; Pinsky et al., 2019; Haddy et al., 2020a). Working equids directly generate income by transporting goods and people through carts, carriages or animals being ridden or packed, by hiring the animals out and selling their products such as offspring, manure and, for donkeys, milk (Valette, 2015b; Gichure et al., 2020; Vasanthakumar et al., 2021). They can also be a source of cash if sold in times of emergency (Vasanthakumar et al., 2021). They also produce income indirectly by supporting other income-generating activities such as trading, agriculture and livestock rearing (Gebreab et al., 2004; Velázquez-Beltrán et al., 2011; Valette, 2015a; Gichure et al., 2020; Haddy et al., 2020a).

Working equids have important social roles as they are lent to community members, strengthening relationships and social status, and they are engaged in religious and traditional ceremonies (Stringer, 2014a, Valette, 2015a; Haddy et al., 2020b). They support domestic tasks like water and firewood transportation, they carry goods from and to the market, the sick to hospitals and children to schools, enabling households to save on transportation and labour costs. In this capacity, they have an extremely important role in reducing the work burden on women (Garuma et al., 2004; Pritchard, 2014; Stringer, 2014a; Zaman et al., 2014; Valette, 2015b; Vasanthakumar et al., 2021). For example, Garuma et al. (2004) reported that in Ethiopia the availability of donkey carts reduced by 100% the burden on women of carrying livestock feed, which could reach up to 22 kg. Portugal and Spain are high-income countries (World Bank, 2022) and for this reason, they are not considered among the settings targeted by this review, however, it should be highlighted that in these countries women highly recognise and appreciate the support they receive from their working equids (Haddy et al., 2020b). In India, Pakistan, Ethiopia and Kenya women have rated working equids as their most valuable animals or among their most essential ones, enabling them to survive (Valette, 2015b).

In Ghana, Kenya, India, Pakistan and Ethiopia, it has been demonstrated that female-headed households owning working equids and, in particular, donkeys, benefit from increased income, access to nutritious food, quality clothing and improved health and school attendance of children that are no longer engaged in domestic work (Avornyo et al., 2015; Valette, 2015b). In Mexico, donkeys provide a crucial contribution within the socioeconomic impact of health problems of working equids in LMICs, to describe how existing research is carried out and highlight research gaps (Grant and Booth, 2009; Munn et al., 2018). The Extension for Scoping Reviews of the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA-ScR) (Tricco et al., 2018) was applied to structure this review. The study was driven by a transdisciplinary approach as it combines animal health equids and different social sciences, reflecting the nature of the One Health approach. This approach considers the interconnections between humans, animals and plants within the environments and socio-political contexts they live in (Zinsstag and Crump, 2022). To achieve an in-depth knowledge of these interdependencies, the One Health approach promotes the integration of different disciplines and it also incorporates non-academic knowledge (Zinsstag and Crump 2022).

Methods

STUDY DESIGN

A scoping review method was applied to identify the current knowledge on the female-gender perspective on the socioeconomic impact of health problems of working equids in LMICs, to describe how existing research is carried out and highlight research gaps (Grant and Booth, 2009; Munn et al., 2018). The Extension for Scoping Reviews of the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA-ScR) (Tricco et al., 2018) was applied to structure this review. The study was driven by a transdisciplinary approach as it combines animal health equids and different social sciences, reflecting the nature of the One Health approach. This approach considers the interconnections between humans, animals and plants within the environments and socio-political contexts they live in (Zinsstag and Crump, 2022). To achieve an in-depth knowledge of these interdependencies, the One Health approach promotes the integration of different disciplines and it also incorporates non-academic knowledge (Zinsstag and Crump 2022).

SEARCH STRATEGY

The search strategy was defined through an iterative trial-and-error process (Kamdar et al., 2015) that was initially conducted on CAB Abstracts and led to a string of keywords that were combined by Boolean operators. Truncation was also applied and different spellings of the same keyword were considered. Among the keywords, the list of LMICs was developed through the filter published by Cochrane (2020). As the filter was based on the 2019 list of LMICs according to the World Bank (2020) for the 2020 fiscal year, changes in 2020 and 2021 LMICs lists were assessed and no discrepancies were found within the filter. Some syntax adjustments were applied to the filter to better adapt it to the different platforms. No limits were applied to the search to retrieve as many publications as possible. The keywords are displayed in Table 1 and the complete search strategy for each database is reported in Supplementary Material 1.
INFORMATION SOURCES

Five databases covering the subjects of human and animal health, veterinary medicine, rural development, animal husbandry, biomedical sciences and policy were consulted through the University of Edinburgh website to assess the published literature on the topic: CAB Abstracts, Web of Science Core Collection, BIOSIS Citation Index, EMBASE and Scopus. Databases from the same platform were searched one at a time. The University of Edinburgh’s academic support librarian peer-reviewed search terms, syntax, general structure and adaptability of the search strategy to the different interfaces before the final search was run (Spry and Mierzwinski-Urban, 2018) on 25 June 2022. Reference lists of publications that met the inclusion criteria were hand-examined at a second stage and the table of contents of whole proceedings and special issues that resulted from the database search and whose subject was rated as relevant were also screened.

ELIGIBILITY CRITERIA

To be eligible for the review, papers had to:

- focus or include as collateral subject the socioeconomic impact of diseases of working equids including horses, donkeys and mules;
- provide a female-gender perspective on the topic intended as the women’s viewpoint as the main article focus or some considerations on the subject including reasons for the exclusion of female participants or the presence of female participants within the study population;
- target non-inflammatory or infectious diseases including zoonoses;
- be set in LMICs according to the current World Bank (2022) classification;
- be full-text peer-reviewed publications or full-texts from non-peer-reviewed literature such as proceedings and organisation reports written and conducted in the form of a research study, in line with the recommendation made by Benzies et al. (2006) and Hartling et al. (2017) on the contribution of grey literature in adding meaningful evidence to reviews;
- be original research and, if appraising the socioeconomic impact of diseases was not the main purpose of the article, the considerations made on the socioeconomic impact of diseases had to be based on the study results;
- be written in English, French, Italian, Spanish and Portuguese.

Publications were excluded if the socioeconomic impact of diseases in working equids was mentioned as a justification to undertake the study but did not develop the concept further. If they targeted categories of equids other than working equids (leisure, race and sport horses), working equids belonging to the army and to the police, and if they were set in high-income countries (World Bank, 2022), publications were considered ineligible since this study focused on the livelihood of disadvantaged communities. Where the full text was unavailable, papers were excluded. Secondary research such as literature reviews, commentaries and books was not considered for this review.

RESULTS

Table 1. Keywords of the search strategy developed for CAB Abstracts. The groups of keywords are combined through Boolean operator AND.

<table>
<thead>
<tr>
<th>Socioeconomic keywords</th>
<th>household' OR commun' OR socioecon' OR econom' OR poverty</th>
</tr>
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<tbody>
<tr>
<td>Disease keywords</td>
<td>disease' OR zoono'</td>
</tr>
<tr>
<td>Working equids keywords</td>
<td>((work' OR pack' OR plough' OR plow' OR draft' OR draught' OR transport' OR traction' OR cart') ADJ3 (animal' OR equid' OR equine' OR livestock OR donkey' OR horse' OR mule')) OR carthorse' OR cart-horse'</td>
</tr>
<tr>
<td>Low- and middle-income countries keywords</td>
<td>Filter by Cochrane (2020)</td>
</tr>
</tbody>
</table>

\(^{1}\)Considers both singular and plural forms within the search.

**CONTEXT OF THE RESEARCH**

Due to time constraints, some aspects of the review process could not be covered but they can be recommended for a future study or to integrate the current review. In fact, grey literature, intended as the set of multiple types of non-peer-reviewed publications (Adams et al., 2017), was not systematically searched in any of the eligible languages. Grey literature could have added evidence to the review, especially from non-English speaking contexts (Benzies et al., 2006). Moreover, national journals that are not indexed by international databases were not screened. Since this is advisable for research targeting LMICs (Alonso et al., 2016), it may have increased the number of eligible articles. Lastly, more papers may have been published since 25 June 2022, when the search was conducted for the last time, which are not included in the review.

**SELECTION OF SOURCES OF EVIDENCE**

A search of five databases for academic research identified 1442 publications that, after automated deduplication by EndNote, were reduced to 1105. Following a manual deduplication, the citations deemed suitable for title screening were 997, from which 519 publications were excluded because of irrelevant topics (498) or not meeting the inclusion criteria (21). The abstract of the remaining 478 publications was then analysed: 239 abstracts were excluded for irrelevant topic (237) or because they referred to whole books (2). A total of 239 publications were identified for detailed full-text evaluation: 232 were excluded because they did not meet the inclusion criteria (Fig. 1), while the full-text of four publications could not be found. At the end of the full-text analysis, three eligible publications were identified. Additionally, the index of seven whole proceedings and two special issues that resulted from the database search and whose subject was rated as relevant for the purpose of this review were screened: one eligible publication was obtained from the index of proceedings and one from the special issues. Afterwards, one additional relevant article was acquired.
from the screening of the references of the three primarily included publications. Overall, a total of six publications were included in the review (the complete reference list is reported in Supplementary Material 2). The stages of the identification of eligible publications are summarised in Fig. 1.

CHARACTERISTICS OF SOURCES OF EVIDENCE
An overview of the main features of the eligible publications such as publication details, study details, study setting and authors’ affiliation is provided in Table 2.

SYNTHESIS OF RESULTS
Six publications incorporated to different extents the female-gender perspective on the socioeconomic impact of diseases of working equids in LMICs. The majority of articles (4/6) were peer-reviewed, while 2/6 were grey literature such as an organisation report and an article from conference proceedings. Most of the papers were published from 2010 onwards with the exception of one that was issued in 2005. All publications were written in English and were open access. Donkeys were targeted overall by 4/6 publications, horses by 4/6 publications and mules by 4/6 publications as most of the articles covered multiple species, including two articles that referred to all the equid species. A total of 3/6 papers targeted infectious diseases and, in particular, epizootic lymphangitis, while 2/6 articles covered both infectious and non-infectious diseases and 1/6 mentioned health problems in general. The majority of publications applied a participatory method (4/6). All studies were set in Ethiopia, which is classified by the World Bank (2022) as a low-income country.
Table 2. Main features of the publications included in the review.

<table>
<thead>
<tr>
<th>Publication details</th>
<th>Study details</th>
<th>Study setting and authors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Author (year)</strong></td>
<td><strong>Publication source</strong></td>
<td><strong>Main focus</strong></td>
</tr>
<tr>
<td>Admassu and Shiferaw (2011)</td>
<td>Organisation report</td>
<td>Socioeconomic role of working equids</td>
</tr>
<tr>
<td>Duguma et al. (2021)</td>
<td>Journal</td>
<td>Description of a community-based intervention</td>
</tr>
<tr>
<td>Martin Curran et al. (2005)</td>
<td>Special issue</td>
<td>Impact of the access to veterinary services</td>
</tr>
<tr>
<td>Molla et al. (2021)</td>
<td>Journal</td>
<td>Evaluation of owners’ knowledge and management of a disease and its socioeconomic impact</td>
</tr>
<tr>
<td>Scantlebury et al. (2015)</td>
<td>Journal</td>
<td>Disease socioeconomic impact</td>
</tr>
</tbody>
</table>

¹Respiratory disorders such as strangles, colic, wounds, epizootic lymphangitis, African horse sickness, anthrax, endoparasites, dermatological problems such as sarcoids, eye problems, ulcereous lymphangitis, lameness.
²Respiratory problems, wounds, colic, dental disorders, foot disease, eye problems, sarcoids, rabies, tetanus, anthrax, strangles.
³This publication was defined as an impact assessment according to the definition of impact assessment in healthcare by Scott-Samuel (1997).

In addition to Ethiopia, one of the studies was also set in Kenya, India and Pakistan. A total of 4/6 papers had at least one author affiliated with a working equid charity, while 2/6 publications had all authors belonging to Ethiopian academic institutions. None of the publications applied the One Health approach, although Duguma et al. (2021) acknowledged the potential benefits of engaging a multidisciplinary team for conducting prospective research combining epidemiologists, social scientists and economists.

RESULTS OF INDIVIDUAL SOURCES OF EVIDENCE: THE FEMALE-GENDER PERSPECTIVE

Among the six eligible publications, only the one by Valette and Upjohn (2014) had a primary focus on the female-gender perspective in relation to the role of working equids. The article highlighted the socioeconomic effects of diseases and death of working equids on women. These effects included the loss of income and its implications on the capacity of the household to cover its basic needs, the consequences on women’s health and on their social status. The indirect impact of working equid diseases on children and on other livestock assets owned by the household were also outlined.

Admassu and Shiferaw (2011) interviewed 65 female-headed households among 528 households, which represented 12% of the total household number. Moreover, the authors ensured that two female heads of households were always included in focus group discussions. The article investigated in depth the socioeconomic contribution of working equids, donkeys in particular, to women heads of households and raised attention towards their role in reducing the work burden on women. However, the considerations of disease’s economic effects were general. In fact, although the information gained depended also on the contribution of the female participants, gender-based specificities on disease economic impact were not outlined.
Duguma et al. (2021) described a participatory intervention to tackle epizootic lymphangitis and highlighted its detrimental socioeconomic effects on cart owners’ livelihood. The authors reported that the female-gender perspective was not relevant to the study context since there are no female muleteers in the Ethiopian region of Bahir Dar. Nevertheless, they acknowledged the importance of exploring gender-related peculiarities and recommended their consideration for future studies in other settings. In an article that calculated the economic effects of epizootic lymphangitis written by Molla et al. (2021), only five women were included among the 248 study participants. The female viewpoint was not outlined nor the reasons for the exiguous number of female participants was discussed.

According to Martin Curran et al. (2005), who reported economic insecurity due to diseases in areas without access to veterinary services, women were too shy to respond to male interviewers. For this reason, they were not included among the study participants. Lastly, in a participatory study that described the impact of epizootic lymphangitis on animal welfare and on livelihoods at both individual and community levels, Scantlebury et al. (2015) recognised the bias of having interviewed only two females among the 358 interviewees. The researchers recommended a more balanced gender inclusion among study participants in future research since women have a crucial role in caring for working equids and they may also bring different viewpoints on animal care.

**Discussion**

Only six eligible publications were identified for this scoping review. While most of them included an exiguous number of female participants, only one article studied in depth the socioeconomic effects of diseases of working equids on women. This means that this subject is dramatically under-researched, although the role of working equids as socioeconomic assets for women has been demonstrated in various settings of relevance (Garuma et al., 2004; Velázquez-Beltrán et al., 2011; Avonnoy et al., 2015; Valette, 2015b; Haddy et al., 2020b; Vasanthakumar et al., 2021). Further research on the socioeconomic impact of diseases of working equids under a female-gender perspective could promote programmes aimed at protecting working equid health and welfare with consequent benefits on women’s health, wellbeing and livelihoods.

Diseases and death of working equids have detrimental effects on women, especially those who are heads of households and who are supported by a working equid for daily tasks, such as trading or farming, lifting of grain to the mill, food purchase (Admassu and Shiferaw, 2011). Farmers are also negatively affected when they are fully responsible for tasks like child and animal care, water and firefighting collection, transport of grain to the mill, food purchase (Admassu and Shiferaw, 2011; Valette, 2015b). If the family income is lost, funds for the education of children, balanced diet, healthcare and veterinary care for other livestock assets are unavailable (Valette and Upjohn, 2014), with negative consequences on the health and welfare of the children of the family members and on the animals belonging to the households (Valette, 2015b). In case of the loss of an equid or of its prolonged inability to work, women may not be able to put in place a sustainable coping strategy (Vasanthakumar et al., 2021). In particular, women heads of households without a source of income may resort to prostitution to support their families (Mbonye et al., 2012; Filho, 2022). Children and young people without access to education and living in poverty may be more vulnerable to radicalisation (Onuoha, 2014), recruitment as child soldiers (Machakanja, 2014) and illegal migration (Nonnenmacher and Yonemura, 2018). The lack of access to a balanced diet and the heavier work burden on women deteriorate further their physical and mental health (Valette, 2015b). Livestock is lost because of diseases, lack of water and feed that are normally delivered by working equids or because of access to sales, with a negative impact on the household’s food security (Valette and Upjohn, 2014). Moreover, savings are used to buy food or essential household items and to cover transportation fees (Valette and Upjohn, 2014).

Due to the loss of their equid, women take a longer time to complete household tasks like fetching water or searching for firewood (Valette and Upjohn, 2014). Having to walk long distances may expose them to sexual violence or war-related risks (Sommer et al., 2014). The time investment in water fetching may reduce income-generating opportunities (Mukuhlani and Nyamupingidza, 2014) and the capacity to diversify livelihood strategies (Velázquez-Beltrán et al., 2011), increasing the vulnerability of female-headed households and damaging their ability to face emergencies and climate shocks (Stringer, 2014a). Women may also have less time for childcare (Valette, 2015b), with consequences on children’s health. Less opportunities for washing the hands of their children and leaving children unattended crawling on the ground and picking unclean objects may expose them to continuous ingestion of pathogens that may determine the environmental enteropathy disease (Ngure et al., 2014). This, together with other factors such as lack of proper nutrition, may lead to stunting and poor early child development (Ngure et al., 2014). Limited availability of water can deteriorate household hygiene and facilitate the spread of faecal-oral transmitted diseases (Bartram et al., 2005). Without firewood, women cannot cook or boil water and milk for food safety purposes. Consequently, women may need to spend time caring for sick children or other family members instead of engaging in income-generating activities (Mukuhlani and Nyamupingidza, 2014). This further increases their health vulnerability since women become more exposed to infectious diseases (Garnier et al., 2020). Lastly, if women are unable to fetch water without the support of their animals, they may resort to dealers who sell water for expensive prices, worsening their economic instability (Bisung and Elliott, 2017). Women may also engage their children in water fetching, with consequent loss of school attendance (Mukuhlani and Nyamupingidza, 2014; Valette, 2015b). Alternatively, they may use unsafe water with the potential spread of water-borne diseases including diarrhoea, which is the second cause of mortality in children under 5 years old (Bartram et al., 2005). A situation of water insecurity can negatively impact women’s mental health (Bisung and Elliott, 2017).

Without a source of income, women can lose their social status and dignity within their community, also because they cannot lend their animals to other community members. This is aggravated by the need to abandon social activities such as women groups because of lack of transportation or time (Valette and Upjohn, 2014) or money to pay for the group fees (Valette, 2015b), therefore missing opportunities to influence change (Garnier et al., 2020). Under these circumstances, women become more unbalanced (Admassu and Shiferaw, 2011). In some contexts, women are involved in waste collection in the community with their working equids (Valette, 2015b). Due to an impaired health of working equids, women may no longer be able to undertake this task, causing waste accumulation, contamination of water and soil and damage for the health of the environment (Godfrey et al., 2019).

From these considerations, it can be evinced that the implications of diseases of working equids on women are multiple and widely embrace human, animal and environmental health as well as social dynamics. Applying a transdisciplinary One Health approach to this research subject would be highly beneficial as it would facilitate the identification of the impacts of working equid diseases from various angles. This could be achieved through the engagement of a transdisciplinary team (Zinsstag and Crump, 2022), with veterinary epidemiologists, equine veterinarians, animal welfare specialists, researchers in animal health economics integrating their expertise with social scientists, gender specialists, researchers in tropical medicine, public health practitioners and specialists in water and sanitation. Moreover, these experts should not be recruited solely from an academic background, but also from non-academic institutions operating in the field (Min et al., 2013; Zinsstag and Crump, 2022). Research results presented through a transdisciplinary perspective may be more effective in creating awareness among policymakers.
about the socioeconomic impact of diseases of working equids on women, therefore promoting funds allocation for programmes aimed at protecting the health and welfare of working equids (Zaman et al., 2014). As part of the transdisciplinary approach, indigenous knowledge and, particularly, knowledge of indigenous women, should be incorporated (Garneri et al., 2020) as it could valuably widen the perspectives on the socioeconomic effects of working equid diseases on women. The acquisition of indigenous knowledge could be enhanced by the application of a participatory method (World Health Organization, 2011), that allows to capture comprehensively the community viewpoint (Catley et al., 2012). For this reason, the participatory method is the most recommended approach to inform sustainable programmes (Catley et al., 2012; Duguma et al., 2021). A participatory approach would also facilitate the identification of knowledge gaps among women in terms of animal health and welfare so that education programmes could be better framed on women’s needs. Understanding women’s knowledge on ethnoveterinary medicine and consequent information sharing may promote capacity to readily available and cost-effective treatment, therefore protecting the welfare of equids and the women’s economic assets (Vasanthakumar et al., 2021). The participatory method was the most frequently applied within the eligible publications of this review. Nevertheless, the limited number of women participants involved in these research studies is in line with the widespread lack of plurality within groups engaged in participatory research, resulting in a biased community voice (Fischer et al., 2020). Some authors of the eligible publications have argued that interviewing women may not be appropriate or feasible in certain contexts (Martin Curran et al., 2005). However, these challenges can be mitigated by engaging female researchers, that would not only facilitate to approach women within communities but would also enhance equality within research teams (Asmail et al., 2022). In LMICs, most of the researchers are males (Yarmoshuk et al., 2021). For example in sub-Saharan Africa only 31.8% of researchers are females (United Nations Educational, Scientific and Cultural Organization (UNESCO) Institute for Statistics, 2019). Females are often disadvantaged because of language barriers, especially in French-speaking contexts (Yarmoshuk et al., 2021). For this reason, the translation of research studies, for example into French, could promote the participation of female researchers in certain settings (Yarmoshuk et al., 2021).

While in a very limited number, the publications included in this review represent a starting point for future research and the need for exploring the female-gender perspective on the socioeconomic impact of working equids’ diseases was highlighted by some of the authors of eligible papers (Valette and Upjohn, 2014; Scantlebury et al., 2015; Duguma et al., 2021). Research that focuses on the female-gender perspective or that considers women’s viewpoints within broader studies can potentially increase awareness among policymakers on the socioeconomic effects of diseases of working equids on women. This could facilitate the inclusion of women in programmes targeting working equids, especially education activities that can improve their capacity to readily available and cost-effective treatment for their animals (Valette, 2015b; Watson et al., 2020). Because working equids are often neglected from interventions conducted by international organisations and governments in LMICs (Valette, 2015a), further research on the socioeconomic effects of their diseases on women’s health and livelihoods may also promote programmes aimed at improving the health and welfare of working equids in the context of animal health programmes for female beneficiaries or within general interventions for empowering women (Valette, 2015b).

CONCLUSIONS AND RECOMMENDATIONS

In conclusion, considering the crucial socioeconomic role of working equids for women (Valette, 2015b) and the paucity of information on the detrimental socioeconomic effects of their diseases that emerged from this scoping review, more gender-based research on health economics in working equids is urgently needed. This will help addressing knowledge gaps and guide future gender-based interventions targeting working equids. In particular, research should target donkeys, that provide the most crucial contribution in reducing the work burden on women and whose ownership has been demonstrated to be more beneficial for female-headed households than male-headed households (Admassu and Shiferaw, 2011). Since the only study that described in depth the socioeconomic impact of working equid diseases on women refers to diseases in general without specifying disease types (Valette and Upjohn, 2014), future research should target individual disease conditions that severely affect the health of working equids such as wounds or tetanus (Martin Curran et al., 2005) or whose high socioeconomic impact have been already demonstrated, for example epizootic lympangitis (Molla et al., 2021), equine trypanosomiasis (Dewi et al., 2020) or foot problems (Solomon et al., 2019). The socioeconomic impact of zoonoses like glanders (Khan et al., 2013) and leptospirosis (Caselani et al., 2012) that compromise the health and welfare of working equids as well as human health could also be investigated. The socioeconomically (Duguma et al., 2021) and nutritionally in working equids should be studied since it is a widespread problem affecting working equids’ health (Burn et al., 2010). Further research may enhance the development of programmes aimed at tackling specific diseases of working equids with a high impact on women’s health and livelihoods. Future research should target contexts where working equids are particularly meaningful to women across Central America (Haddy et al., 2020a; Vasanthakumar et al., 2021), South America, Africa, Asia (Valette, 2015b), Western Europe (Haddy et al., 2020b) and Middle East including conflict-affected countries and pastoralism settings where nomadic women use working equids to move and to carry young children (author’s personal observation). Gaining figures such as the percentage of use of working equids by women in different contexts could raise awareness on the socioeconomic importance of working equids to women and, consequently, could promote funding allocation for research on the socioeconomic impact of health problems of working equids on women.

The number of eligible publications is too limited to draw considerations on the authors’ gender and affiliation. Nevertheless, it should be highlighted that the only article discussing in depth the socioeconomic impact of diseases of working equids on women was written by two female researchers (Valette and Upjohn, 2014). The inclusion of females within research teams is essential to foster gender-sensitive research and to access women within communities (Leduc, 2009), resulting in gender balance within participatory groups and in the acquisition of a thorough community voice (Fischer et al., 2020). Because the majority of publications had at least one author belonging to a working equid charity, these institutions should become the drivers for sensitisation of authors engaged in working equid research to incorporate the female-gender perspective within their studies. The application of a participatory method to prospective research can ensure that the community viewpoint (Catley et al., 2012), while the One Health approach can effectively highlight the interconnections between working equid health and welfare and women’s health, wellbeing and livelihoods as well as environmental health, facilitating the translation of research into policy. Integrating women’s perspectives, including those of indigenous women into One Health research can enhance the identification of more sustainable solutions to tackle the burden of working equid diseases (Garnier et al., 2020). To promote the funding of One Health research targeting working equids, the institutionalisation of One Health within working equid charities – that has been already finalised by Brooke (Brooke, 2022b) – may be beneficial. On the other hand, publishing future research on One Health journals may have a multiplier effect on the research output on working equids and One Health since this would sensitise researchers and development workers on the links between working equid health, livelihoods, human and environmental health, including the female-gender perspective.
CONFLICT OF INTEREST
The authors declare that no conflict of interest exists.

ETHICS STATEMENT
This article did not require any ethical approval.

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AUTHOR CONTRIBUTIONS
MB designed and wrote the article as part of her MSc dissertation. GC and NA supervised and revised the study. All authors approved the submitted article.

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References


Hartling, L. et al. (2017) Grey literature in systematic reviews: A cross-sectional study of the contribution of non-English reports, unpublished studies and dissertations to the results of meta-analyses in child-relevant reviews. BMC Medical Research Methodology 17(64), 1–11. DOI: 10.1186/s12874-017-0347-z.


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Microsoft Excel (2021) Microsoft Corporation, USA.

Microsoft Word (2021) Microsoft Corporation, USA.


Perry, B. (2017) We must tie equine welfare to international development. Veterinary Record 181(22), 600–601. DOI: 10.1136/vr.j561.


Stringer, A.P. (2014a) Improving animal health for poverty alleviation and sustainable livelihoods. Veterinary Record 175(21), 526–529. DOI: 10.1136/vr.g6281.


Zinsstag, J. and Crump, L. (2022) Advancing integrated approaches to health through the new transdisciplinary CABI One Health resources. CABI One Health 1(1–2). DOI: 10.1079/cabiohealth20220001.