Occupational health hazards in Livestock farming: A case study of Himachal Pradesh, India

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Abstract

Livestock rearing plays a crucial role in the farming system and economy of Himachal Pradesh, a hilly and mountainous state in India. The present study was under taken with the aim of assessing the occupational health hazards faced by livestock farmers in the region and identifying potential safety measures to mitigate these risks. The study was conducted in three districts namely Kangra, Chamba and Mandi and the required data was collected from 120 livestock farmers using a well-designed face to face questionnaire. The study indicated that livestock farmers, particularly goat and sheep farmers are exposed to various physical, biological and psychological health hazards due to the demanding nature of their work. These hazards include noise, slips and falls, physical injuries and musculoskeletal strains. From the study, it was found that 95% of Gaddi farmers are frequently exposed to noise hazards and 90% to slip, trip, and fall incidents due to their migratory lifestyle, unlike cow and buffalo livestock farmers. In terms of exertion levels in livestock activities, Gaddi farmers perceive grazing and bundling as very heavy tasks (75%), while cow-buffalo farmers consider bringing fodder as heavy (70%). The injuries are common among *gaddi* farmers, with 70% reporting major cuts and 33.33% experiencing multiple injuries, whereas 36% of cow-buffalo farmers report major cuts alongside minor ones (100%). The results provide valuable insights into the challenges faced by livestock farmers in Himachal Pradesh and offer a clear understanding to policymakers and the scientific community on where to direct efforts to improve the quality of life and productivity for these farmers.

Keywords: Livestock rearing; Occupational health hazards; Livestock farmers; musculoskeletal strains; Health and safety conditions

Introduction

India is ranked one in livestock population across the world with total livestock population of 536.7 million (4.8 % growth in a decade) and majority of population i.e., 95.78 % are found in rural areas (Sharma et al. 2022). The livestock sector in India plays a pivotal role in the country's economy, contributing significantly to its growth and development as it provides farmers a consistent source of income in form milk, egg, meat etc. (Madhu et. 2023). In India the annual production of milk, egg and meat was reported 210.90, 6.71 and 4.52 million tonnes contributing to the world share of 23.0, 7.19 and 3.30 % which serves as direct food and income to 64.12 % rural population of India (MoA&FM, 2022). Livestock has very important role in socio-economic life of Hilly areas of Indian subcontinent (Gautam et al 2021). In the state of Himachal Pradesh of India versed with hilly and mountainous terrain, livestock rearing is an essential aspect of the agricultural system and economy. As per the 20th Livestock census, the total livestock population in Himachal Pradesh is 4.41 million tonnes contributing 0.82% of the total livestock population but 99.1% of this livestock population is reared in rural areas while only 0.9 % by urban population (Sharma et al. 2022) serving a vital source of livelihood for the rural population. The contribution of major livestock products, such as milk, wool, eggs and meat play a significant role in the overall agricultural output of the state. Particularly in the tribal areas of Himachal Pradesh, livestock rearing holds greater prominence compared to agriculture due to the challenging terrain and topography. However, the occupation of livestock farming is accompanied by numerous occupational hazards that pose risks to the health and safety of the farmers. These hazards include physical, chemical, biological and psychological factors, resulting from the demanding and strenuous nature of the work environment. In this context, it is crucial to focus on the prevention of diseases through the effective design and management of animal husbandry systems to ensure the safety and health of both humans and animals (Kimman et al., 2013). The Food and Agriculture Organization (FAO) has also addressed the issue of risk assessment in animal health through publications such as the *Technical Guidelines on Rapid Risk Assessment for Animal Health Threats*, which provide guidance on rapid risk assessment methods and strategies to mitigate health-related problems in agricultural workers. The issues like high rates of depression, physical health problems, and social isolation among livestock farmers are often attributed to factors such as lower education levels, having three or more children, and existing physical health problems (Cakmur, 2014). In a developed country like the USA, studies have observed that risk factors for animal-related injuries are significantly associated with younger age, doctor-diagnosed arthritis, use of hearing aids, and higher education levels. On the other hand, off-farm work has been associated with a lower risk of such injuries (Sprince *et al*. 2003). In regard to our country India, farm workers are extensively engaged in various agricultural operations and are susceptible to musculoskeletal and mechanical injuries (Ojha and Singh 2018) due to the lack of knowledge regarding various diseases associated with livestock rearing and the implications of zoonotic infections Addressing these gaps through studies related to occupational health hazards and risks in livestock farming is essential. Such research can focus on raising awareness of safe handling and management practices, while emphasizing the development of policies and programs to safeguard the health of livestock farmers (Tripathi 2016).

In Himachal Pradesh, no comprehensive study has been conducted on the health and safety hazards faced by livestock farmers, despite the majority of the population being involved in livestock rearing in some capacity. The present study aims to address this gap by identifying the specific health and safety challenges faced by livestock farmers in the hilly regions of Himachal Pradesh, with the following objectives:

1. Assessment of Health Hazards and Occupational Risks
2. Identification of Injury Patterns and Animal Health Management Practices

By achieving these objectives, the study will provide a better understanding of the challenges faced by livestock farmers, enabling policymakers and relevant authorities to develop targeted policies and schemes to improve the health and safety of livestock workers. Furthermore, the study will offer valuable insights into enhancing the quality of life for livestock farmers, which, in the long term, will promote sustainable farming practices and ensure the overall well-being of both animals and farmers in the region.

Materials and methods

The study was conducted in Kangra, Chamba, and Mandi districts of Himachal Pradesh, India, representing mountainous undulating agro-climatic conditions. The required data were collected from 120 livestock farmers, comprising 40 farmers from each district. The sample included 60 cow and buffalo farmers and 60 goat and sheep farmers. Among the 120 farmers, 40, predominantly from Chamba district, resided in high-altitude regions (1,200–3,000 meters above sea level) (Figure 1). Another 40 farmers from Kangra district were located in plain altitudes (240–1,000 meters above sea level), while the remaining 40 farmers were from mid-altitude regions (1,000–1,500 meters above sea level). The primary reasons for selecting these districts were farmers willingness to cooperate, the absence of urban influence, and the significant number of farm families in the region, ensuring a representative sample. A well-designed, interview-based questionnaire was developed in collaboration with the Department of Veterinary Public Health and Epidemiology, COVAS, CSK HPKV. The questionnaire aimed to collect information on general and socio-economic aspects, health hazards associated

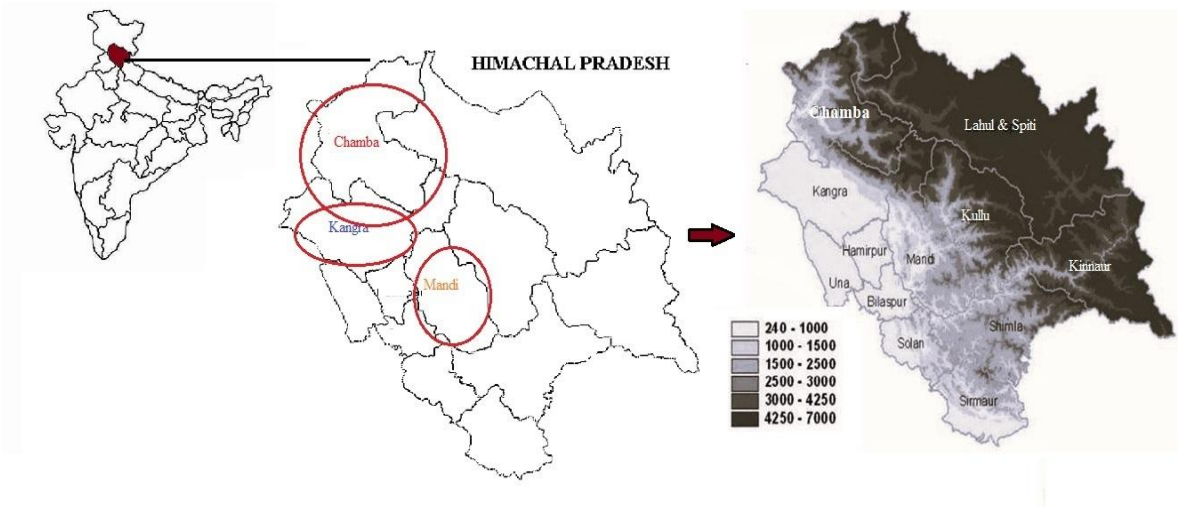
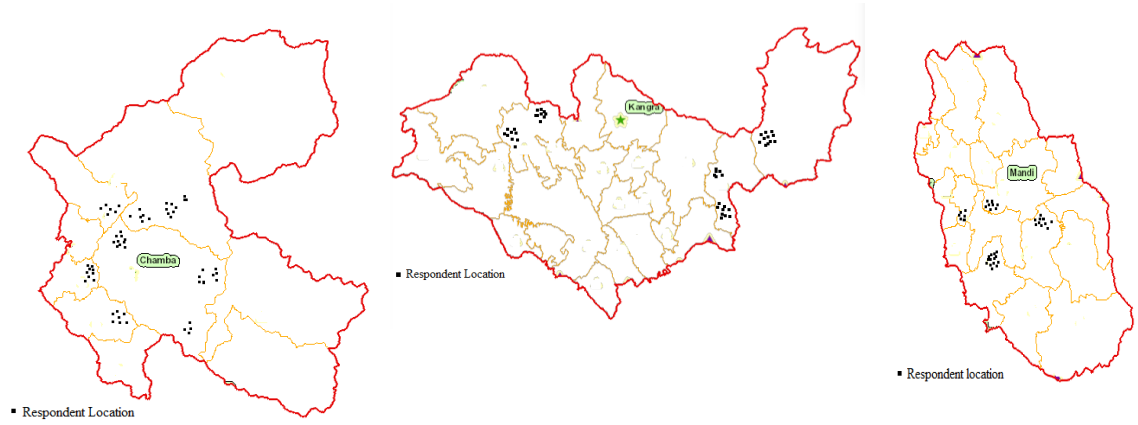


Fig1: Map of the study area with digital elevation



Distict Chamba District Kangra District Mandi

Fig 2: Respondent location with respect to the study districts

with livestock and allied activities, and risk management practices. Before commencing data collection, the questionnaire was pretested with a small group of livestock farmers, and necessary modifications were made to improve its effectiveness. The details of the study area are presented in Figure 1, while the locations of the livestock farmers are shown in Figure 2.

Results and discussion

General information of Livestock farmers

The study results revealed that *gaddi* shepherds (goat and sheep farmers) follow a unique and systematized pastoral cycle, spending most of the year herding sheep and goats. They primarily engage in seasonal migration of livestock flocks, moving from one grazing pasture to another. In respect to the size of flock (small flocks consist of 100-200 animals, medium flock 200-350 and large flocks consist of >350 animals) it was revealed that majority of the farmers (45%) own medium flock size, followed by small flocks (39%) while very few were with larger size flock (16%). The study also indicated that over 70% of milch (cow and buffalo) farmers own fewer than five animals. Most farmers (45%) rear cows for livestock farming as a side business and to support family nutrition, whereas 86.6% of *gaddi* shepherds rear their livestock as their primary source of income.

From the general profile of the selected respondents, it was revealed that majority of respondents rearing cows and buffalo were more than 36 years of age i.e., 80.0 % with the largest proportion (35%) belonging to the age group of 36–45 years. Among *gaddi* livestock farmers, all respondents (100%) were above the age of 36, with the highest proportion (48.3%) falling within the 46–55 age group. In terms of the education

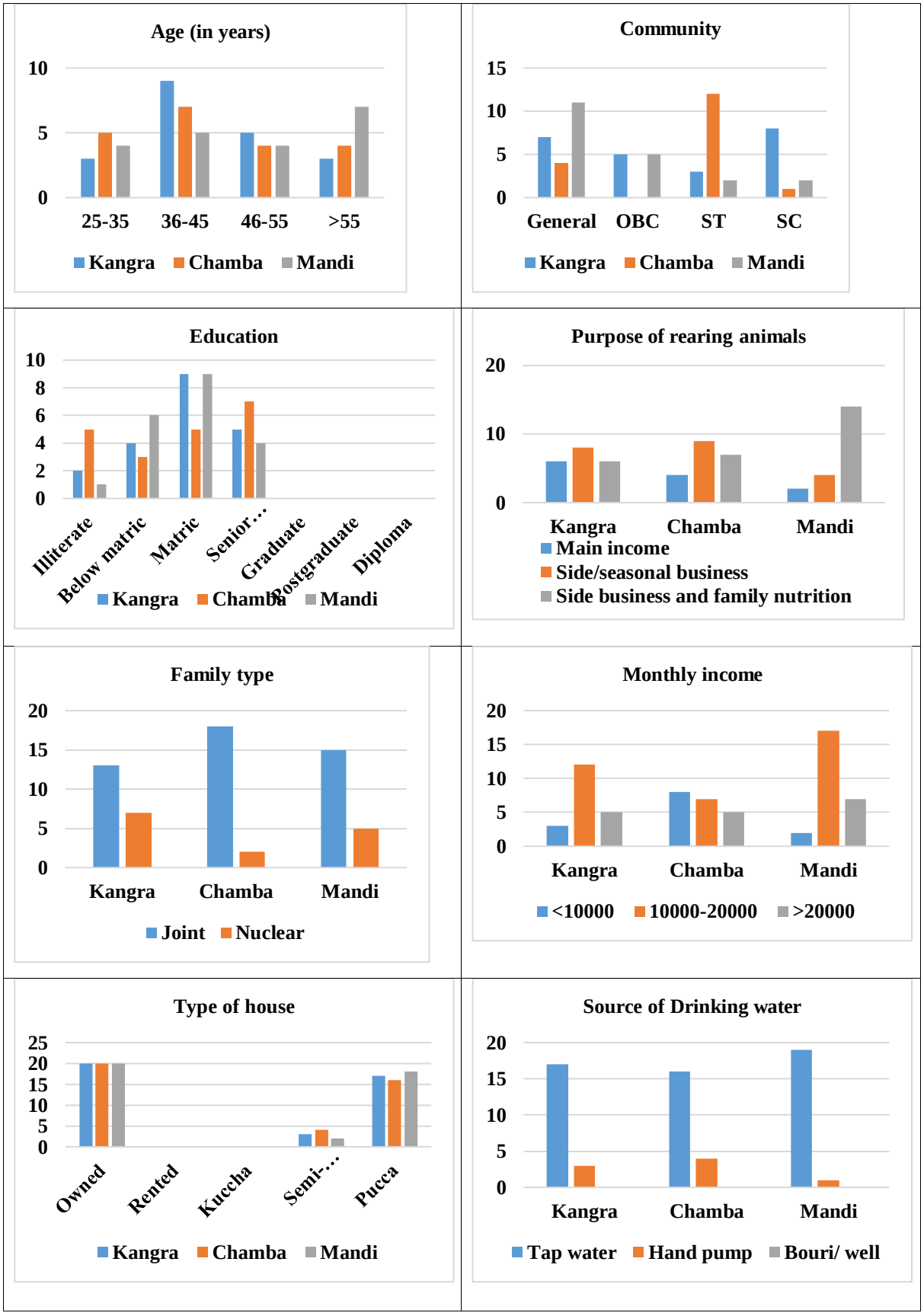


Fig 3 General profile of live stock farmers (cow and buffalo) in Himachal Pradesh

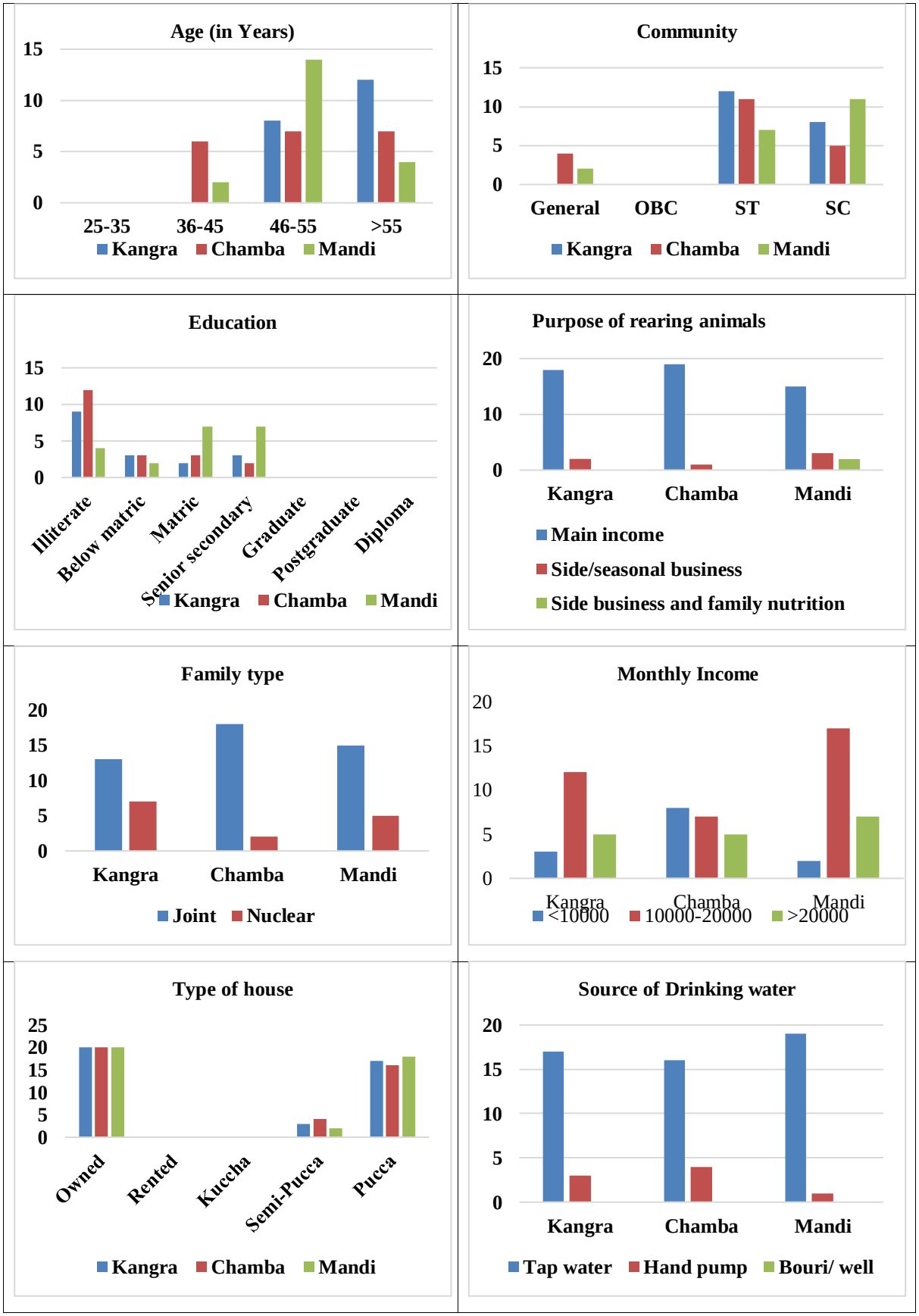


Fig 4 General profile of live stock farmers (Goat and sheep) in Himachal Pradesh

of the livestock farmers, the illiteracy rate found more in sheep & goat i.e., 41.6 % livestock farmers while as only 13.3% in farmers rearing cow and buffalo. In addition, all the respondents regardless livestock type belong to the marginal land holding category. The details pertaining to the general profile of the livestock farmers rearing cow-buffalo and sheep-goat are presented in Figure3 and 4 respectively. Upon anthropometric assessment of the livestock farmers, it was observed that the Body Mean Index (BMI) of cow and goat farmers were 22.71 and 21.81 kg/m^2 respectively.

Exertion in livestock rearing

The exertion levels for livestock-rearing activities were analyzed using a scale ranging from 1 to 5, where 1 represented "very heavy" exertion and 5 indicated "very light" exertion. The results revealed that among various livestock-rearing activities such as fodder cutting and bundling, bringing fodder, grazing animals, feed preparation, silage making, animal hygiene and care, bringing and watering animals, dung collection, dung cake preparation, animal shed maintenance and sanitation, milking, milk product preparation, and marketing of milk and milk products the majority of farmers (70%) perceived *bringing fodder* as a "heavy" exertion activity. This was followed by *bringing and watering animals*, which was rated as a "heavy" exertion activity by 43.33% of farmers. This might be due to tough challenges the such as steep terrain and remote pastures, increasing the physical strain of grazing and bringing fodder and water. For goat and sheep farmers, 75% considered *grazing and bundling* as a "very heavy" exertion activity, while 71.66% rated *grazing animals* as a "heavy" exertion activity. This high exertion level can be attributed to managing medium-to-large flocks (200–350 animals), which demand significant physical effort for both grazing and bundling. Additionally, it was observed that *gaddi* farmers, who lead migratory lifestyles and keep their livestock in the open, do not have animal sheds. As a result, activities such as dung collection, dung cake preparation, animal shed maintenance, sanitation, and milking were not applicable to *gaddi* farmers.

Assessment of Health Hazards and Occupational Risks

The assessment of health hazards and occupational risks associated with livestock and allied activities were based on three level scale “Never, sometimes and Frequently” during various physical operation for rearing of livestock. The study revealed that *gaddi* farmers frequently suffer from noise hazards, with 95% reporting frequent exposure. This is attributed to managing large herds of animals, a situation not observed among cow and buffalo farmers. Additionally, 90% of gaddi farmers reported frequent occurrences of slip, trip, and fall hazards, primarily due to transporting flocks through highland pastures. In contrast, among cow and buffalo farmers, 73.33% reported experiencing slip, trip, and fall hazards only sometimes, and none reported frequent occurrences. The reduced frequency of these hazards among cow and buffalo farmers can be attributed to their more stable environments and less challenging terrain, which decreases the likelihood of such accidents. Furthermore, all Gaddi respondents reported physical injuries related to carrying heavy loads during journeys or lifting animals, such as young calves that slipped or tripped on mountainous paths. Specifically, 45% experienced these hazards sometimes, and 55% frequently. In contrast, cow and buffalo farmers reported minimal health hazards in this regard, with 25% experiencing such risks sometimes and the majority (75%) indicating no occurrences. The details of these findings are illustrated in figures 5 and 6 of cow and buffalo farmers compared to sheep and goat farmers (*gaddi* farmers).

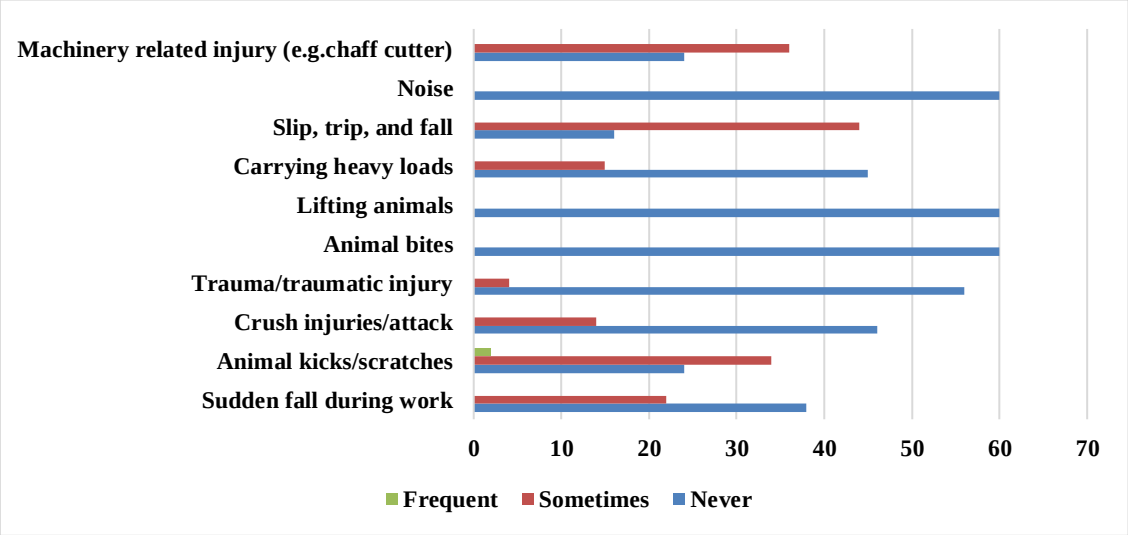


Fig 5: Health hazards for cow and buffalo livestock rearing

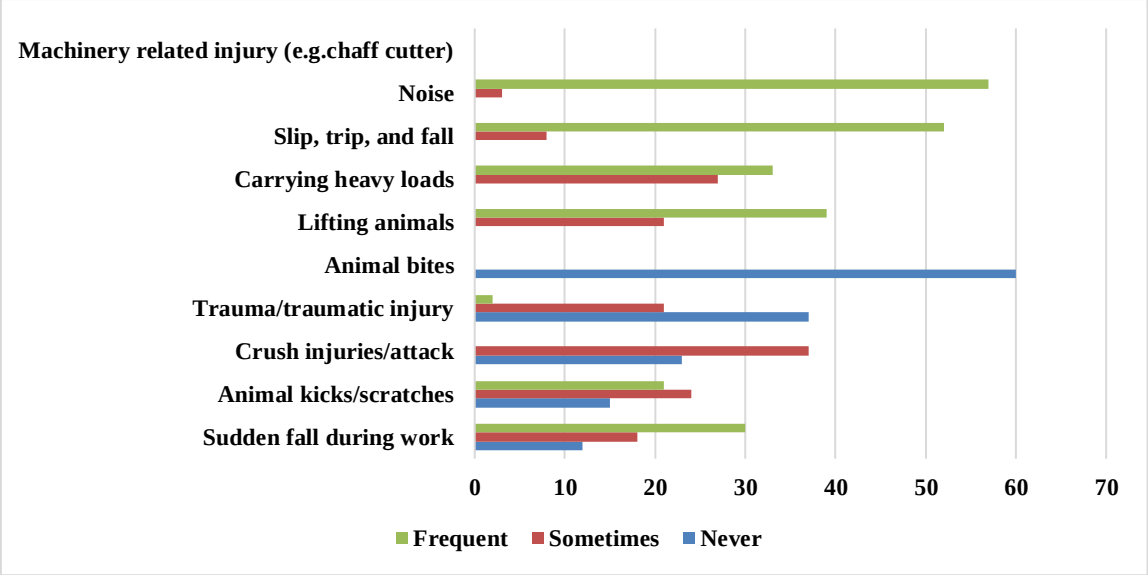


Fig 6: Health hazards for sheep and goat livestock rearing

In terms of biological hazard, it was revealed that 76 per cent of *gaddi* respondents reported sometimes experiencing foot and mouth disease (FMD) within their flocks, while 24% reported frequent occurrences as it is a common problem in the flock. The high prevalence of mite and tick infestations among gaddi farmers can be attributed to their prolonged outdoor exposure. A similar trend was observed among cow and buffalo farmers, where 90% reported experiencing FMD hazards sometimes. Gaddi shepherds were also frequently infested with mites and ticks, with 100% of respondents reporting this issue as a frequent hazard as they are far away from veterinary clinics and are thus unable to manage it at fast pace. However, such hazard was not reported by cow and buffalo rearing respondents. Irrespective of type of livestock the farmers majorly rely on small grasses, tree leaves and do not cultivate fodder/forage crops so none of them experienced any type of chemical hazard.

In relation to health ailment/ musculoskeletal disorder, 93.33 per cent of them reported backache and 96.67 percent leg pain but that was not frequent,71.67 per cent experienced joint pain which may be connected with endless journey these shepherds undergo during their life. In case of cow and buffalo, 76.67 per cent of them reported backache and 36.67 percent joint pain and no other significant musculoskeletal disorders observed.

Identification of Injury pattern and health management practices

The injury related characteristics reported by the respondents revealed that the injuries were generally minor in nature that occurred mainly in the field during the rainy season, particularly in the afternoon and evening, irrespective of the type of livestock. The majority of the *gaddi* respondents i.e., 70 % reported the major cuts on skin, 56.67 % experienced minor cuts on skin and 33.33 % respondents reported multiple injuries and skin diseases. The *gaddi* respondent also highlighted the risk of wild animal attacks, one shepherd reported being attacked by a bear, resulting in severe facial injuries sustained during the encounter. In case cow and buffalo, 100 % respondent reported minor cuts and 36 % also experienced the major cuts alongside to small cuts.

In relation to animal health management practices followed by farmers, all respondents irrespective of type of livestock reported that they go for animal health check only when needed due to the distant locations of veterinary clinics in villages. However, 93.33 % of gaddi farmers respond immediately to sick animal while as 100 % cow and buffalo farmers react immediately by self-diagnosing and doing traditional treatment referring local pharmacist if the disease is beyond their control.

In relation to level of awareness among the respondents regarding occupational health hazards and risks in livestock rearing it was found that 20% of cow and buffalo famers and 6% of *gaddi* farmers were fully aware that animal workers may be infected when they come into contact with animal dung, saliva, urine etc. directly or indirectly. An equal distribution of expression was recorded for awareness regarding improper disposal of diseased dead animals having bleeding from mouth, nose ears, vagina etc. that may be source of infection to humans. The majority of farmers (more than 80%) despite of type of livestock rearing were aware about burring of dead fetus, birth fluids and placenta etc. of aborted animals may prevent infectious diseases. For preventive measures, all respondents whether rearing cow and buffalo or sheep and goat reported that they do not use protective clothing / gloves /masks/boots etc. However, all the respondents of both categories reported that they follow proper washing of hands after working with animals, farm before eating and before food preparation. Since goat and sheep farmers have migratory life and have to manage a large herd so they pass their whole day in the surroundings of these animals (100%).

Conclusion

The study highlights significant insights into the practices, challenges, and occupational risks faced by livestock farmers, emphasizing the distinct experiences of gaddi shepherds and cow-buffalo farmers in three districts namely Kangra, Chamba and Mandi of Himachal Pradesh India. The Study reported *gaddi* shepherds predominantly rely on livestock rearing as their primary income source (86.6%) while most cow-buffalo farmers rear livestock as a supplemental activity (45%). The education disparities were evident, with 41.6% of gaddi shepherds being illiterate compared to 13.3% of cow-buffalo farmers. In terms of health risks, which were more pronounced among gaddi shepherds, with 95% frequently exposed to noise hazards and 90% to slip, trip, and fall incidents due to their migratory lifestyle. In contrast, these risks are less frequent among cow-buffalo farmers, with 73.33% reporting occasional fall hazards. In case of exertion levels in livestock activities revealed that gaddi farmers perceive grazing and bundling as very heavy tasks (75%), while cow-buffalo farmers consider bringing fodder as heavy (70%). Injuries are common among gaddi farmers, with 70% reporting major cuts and 33.33% experiencing multiple injuries, whereas 36% of cow-buffalo farmers report major cuts alongside minor ones (100%). Despite awareness of certain preventive measures like proper waste disposal to avoid infections, the use of protective gear remains absent across all respondents.

The study results are invaluable for policy-makers, scientists, and agricultural extension services aiming to enhance farmer livelihoods and reduce occupational hazards. The study offers a foundation for further research into optimizing livestock management and health care practices in migratory and stationary farming systems. Thus, the farmers can benefit from tailored recommendations to alleviate exertion levels and health risks, improving their quality of life and productivity.

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Conflict of interest

On behalf of all authors, the corresponding author states that there is no conflict of interest.

References

1) Cakmur, H, 2014. Health risks faced by Turkish agricultural workers. The Scientific World Journal.
2) Food and Agriculture Organization of the United Nations, 2021. Technical guidelines on rapid risk assessment for animal health threats. Food and Agriculture Org.
3) Gautam S, Neupane N, Dhital B, Neupane H, Bhatta SP 2021. Status of cattle and buffalo farming in Banepa, Panchkal, Panauti of Kavrepalanchock district, Nepal. Journal of Livestock Science 12: 125-131. doi. 10.33259/JLivestSci.2021.125-131
4) Kimman T, Hoek M, Mart CM de Jong, 2013. Assessing and controlling health risks from animal husbandry. NJAS- Wageningen Journal of Life Sciences, 66: 7-14
5) Madhu D.M., Gunadal, N.M. and Harshita, H.C. 2023. Livestock Sector in India: An Insight into its Economic Significance. Krishi Science. Available online at https://krishiscience.co.in/
6) MOA&FW, 2022. Ministry of Agriculture and Farmers Welfare, Department of Agriculture & Farmers Welfare Economics & Statistics Division. Agricultural Statistics at Glance 2022. p 228
7) Ojha P, and Singh A, 2018. Assessment of occupational health hazards among farm workers involved in agricultural activities. Journal of Pharmacognosy and Phytochemistry, 7(1S), 1369-1372.
8) Sharma, M., Thakur, D. and Thakur, A., 2022. Dynamics of livestock population in Himachal Pradesh. Indian Journal of Dairy Science, 75(1).
9) Sprince NL, Zwerling C, Lynch CF, Whitten PS, Thu K, Logsden–Sackett N and Alavanja MC, 2003. Risk factors for agricultural injury: A case–control analysis of Iowa farmers in the Agricultural Health Study. Journal of agricultural safety and health, 9(1), 5.
10) Tripathi H, Tripathi, BN, Shyam, J. Balaraju, BL. 2016. Awareness Regarding Occupational Health Hazards and Risks of Zoonoses Associated with Livestock Rearing Among Male and Female Workers in Uttar Pradesh. Indian Journal of Extension Education, 52(1): 38-44.