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Major Health Constraints and Ethno-Vet Practices of Small-Scale and Backyard Chicken Production in Some Selected Regions of Ethiopia

Meskerem Adamu Chere

Abstract

A study was conducted with the aim of assessing the major health constraints facing the small-scale and backyard chicken producers and ethno-vet practices exercised in five regions of the country: Amhara, Benishangul-Gumuz, Oromia, Southern region, and Tigray. Household respondents were purposively selected and interviewed. Data were collected through pretesting, semi-structural questionnaires, and field observation. The overall frequency of diseases reported as the main health constraint was Newcastle disease (64%) followed by gastrointestinal infection (34%), respiratory syndrome (22%), internal and external parasites (16%), coccidiosis (15%), and fowl pox (5%). They had no awareness how to manage chicken diseases (91.5%), and their flocks were not vaccinated (84%). High disease occurrence is reported in long rainy season (59%). Ethno-vet practice was experienced by the majority of the interviewed households (51.9%). A total of 19 medicinal plants were reported as being used as a traditional medicine. The main causes of losses were identified as disease (67%) and predator attack (32%). Poor disease prevention and control and the lack of knowledge and management skills were the major constraints of poultry production in the study areas. Research and extension efforts should be directed at the identified constraints. Farmer training and improvement of veterinary services are important.

Keywords: chicken, constraints, ethno-vet practices, small scale, backyard

1. Introduction

Poultry is the most widely used important species of animal in the majority of the countries, and it provides nutritionally beneficial food (animal protein); in addition, they can be raised with limited resources since they convert a scavenged feed resource into animal protein, and they are also used for generating income by the poor peri-urban and rural households [1]. According to the agricultural sample survey report of Central Statistical Authority [2] of 2014, the total chicken population in Ethiopia is estimated at about 51 million, of which 96.9, 2.4, and 0.8% are indigenous, hybrid, and exotic chickens, respectively. From these, 99%

of them are reared under the traditional or scavenging production system of management, whereas 1% is reared under intensive management system [3, 4]. Above 98% of the total chicken products comes from village poultry [5, 6]. However, the production and productivity from village chickens are very low compared to their high numbers. This is mainly due to low productivity levels and poor management systems. There are also different constraints in the village chicken production systems. These include diseases, poor management, poor growth rates, predation, and lack of organized markets. Parasitic and other infectious diseases are also common in the tropics where the standard of husbandry is poor, and yet climatic conditions are favorable for the development of diseases [7, 8]. Poultry diseases are considered to be a serious problem for poultry production in Ethiopia. However management and health-care situations as well as ethno-vet practices are not adequately studied and compiled. The purpose of this study was, therefore, to develop a baseline information on management and major health constraints of chickens and ethno-vet practices in some selected parts of the country.

2. Research methodology

A survey study was conducted in five regional states of Ethiopia. Study regions have a relatively high density of chickens (**Figure 1**). Standing from the constraints of human labor and finance, purposive sampling method has been carried out to identify zones. Data were collected from a total of eight zones representing five regions, namely, Amhara (Debre Berhan and Kombolcha), Benishangul-Gumuz (Assosa), Oromia (Haramaya and Jimma), Southern region (Hawassa area and Yergalem), and Tigray (Mekelle), which are located in different agroecologies. Ethiopia has six traditional climatic zones, defined by altitude and temperature: (1) hot lowlands (<500 m), (2) lowlands (500–1500), (3) midlands (1500–2300), (4) highlands (2300–3200), (5) highlands (3200–3700), and (6) highlands (>3700). Except for Debre Berhan (2636) that is located at the highlands, most study areas are located at the midland climatic zones, Kombolcha (1825), Assosa (1514), Haramaya (2046), Jimma (1754), Hawassa area (1769), Yergalem (1735), and

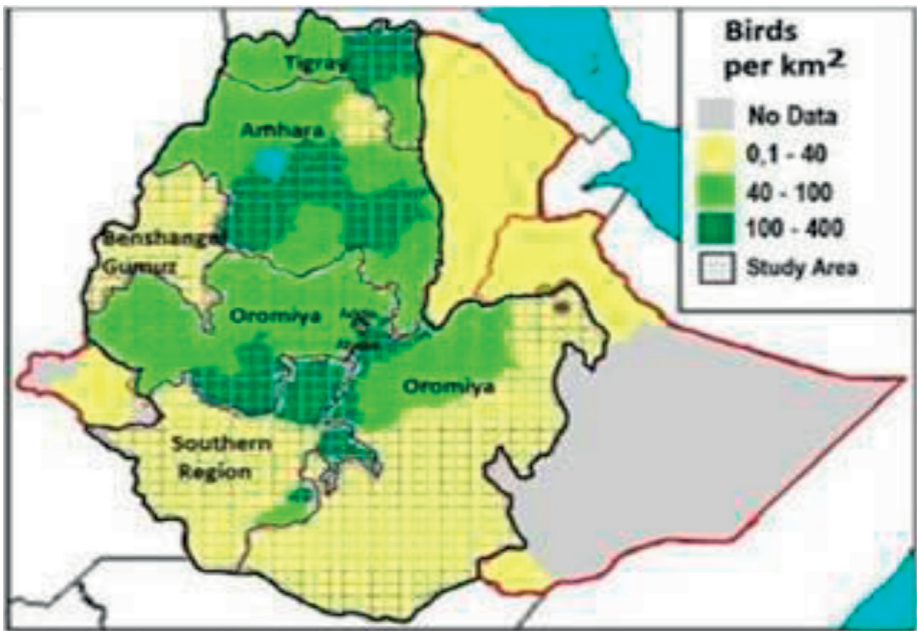


Figure 1.
Map of Ethiopia indicating poultry density and study area.

Questionnaire format used to assess major health constraints facing the small scale and backyard chicken producers and ethno-vet practices exercised in selected study areas of Ethiopia:

1: General Information:

1.1. Region _____, Zone _____, District _____, Woreda/sub city _____ Name of enumerator _____ Signature _____

1.2. Name of Farmers or Managers _____

1.3. Education level: A. Illiterate B. Read and write C. Primary S, D. Secondary education, E. Higher education F. Training on chicken management G. Others

2. Chicken management: how many years have you risen chickens? _____

2.1. Housing systems: A. simple shade B. proper chicken house C. sharing with family
D. others _____

2.2. What types of chicken breeds do you have? A. Exotic B. Hybrid (Crossbred) C. Local

2.3. Chicken flocks (Please indicate the number of chickens by their breed and age group)

S. N	Chicken age	Local	Crossbred	Exotic	Total
1	chicks (up to 8 weeks)				
2	growers (9 to 20 weeks)				
3	adult birds (more than 20 weeks)				

2.4. Who is responsible for chicken management?

A. Husband B. Wife C. Children E. Other (parent, neighbors, hired person), specify

3. Health:

3.1. Disease identification, mostly affected age, vaccination, treatment used, herbs or traditional medicines used, Awareness

S. N		Disease identification		Affected age	Vaccination		Treatment /vaccine type	Sources of drugs				Awareness	
		local name/ symptom	scientific name		yes	no		herbs	Vet. clinic	human pharmacies	other	yes	no
1	number of sick chickens						Drugs /vaccine						

3.2 Poultry disease: farmer's described diseases by symptoms and local names:

- a) Noisy breathing, watery discharge from nose and coughing which spread rapidly in the flock. This was interpreted as respiratory syndrome or gunfan (local name).
- b) Whitish green diarrhea, mass death, respiratory disease and paralysis, disease which could not be cured. This was interpreted as a Newcastle disease (fengil).
- c) Acute respiratory disease of chickens characterized by nasal discharge, sneezing, and swelling of the face under the eyes. This was interpreted as Infectious choriza (yefit mabet).
- d) Wart like lesions on the combs. And wattles that spread to the sides of the beaks. This was interpreted as fowl pox (fentata).
- e) Passing out of bloody droppings, weakness, ruffled feathers and lack of appetite. This was coccidiosis (yedem tekeimat).
- f) Other

3.3. Do you treat? A. All your chickens B. Only sick chickens

3.4. Who administers the treatment? A. Farmers B. Animal health personnel

3.5. Do they cure after these treatments? A. Yes B. No C. sometimes yes

3.6. Have you ever lost all chickens due to diseases in the last 24 months? A. Yes B. No

If yes, what are the symptoms of diseases? _____

How many chickens due you lost? A. Quarter B. More than half

3.7. In which season do you observe high disease occurrence? Specify the disease type. Long rainy season = Jun, July, August and September. Short rainy season = February, March, April and May

A. Both in long & short rainy season B. Long rainy season C. Short rainy season.

3.8. What measure do you take during poultry disease outbreak?

A) Visit veterinary clinic ____ B) Sale infected bird's ____ C) Apply traditional medicine ____ D) Other options (mention)

3.9. What type of drugs/vaccine did you get from Veterinary clinic?

A. In form of powder B. Injectable drugs C. None D. vaccine

3.10. Have you ever bought any drug other than vet clinic? A. Yes B. no if yes, from where____

3.11. List down the names of traditional medicines you know or utilize for poultry disease treatment

A. _____ B. _____ C. _____

3.12. Please indicate the part of plant materials used and mode of preparation _____

3.13. Have you ever lost all chickens due to predators in the last 24 months?

A. Yes B. No

3.14. How many chickens do you lost? A. Quarter B. More than half C. none

Figure 2.

A structured questionnaire used to select household respondents.

Mekelle (2143). The distance from the capital city, Addis Ababa and the study areas falls in the range 130 between and 783kms.

Two kebeles per zone with a high density of chickens and with known chicken-rearing practices were purposively selected in consultation with the respective agricultural development agencies. A total of 162 household respondents involved in small-scale and backyard chicken production (20 households in each zone) were selected and interviewed. Further information was also collected from individual observations and through open discussions during the time samples were collected.

There are local and exotic chicken breeds available in Ethiopia. Local (indigenous) chicken breeds are mostly called by their local name, which are named after the color of their feathers or their location. Exotic chickens are commercial breeds imported to Ethiopia for commercial purpose, either layers or broilers. Formerly the exotic ones were kept only in commercial farms with intensive management and the local or indigenous breeds in backyard or free-range chicken production systems. Currently, exotic and crossbreeds (exotics with indigenous) are being kept in backyard chicken production systems with certain inputs [9]. According to FAO, the level of biosecurity in Ethiopian poultry production is classified into three: large commercial poultry production with “moderate to high biosecurity,” small commercial poultry production with the “low to minimal” biosecurity, and village or backyard production with “minimal biosecurity” [10].

A structured questionnaire was carefully designed and administered to selected household respondents (**Figure 2**). The information inquired included general information, knowledge how to manage chickens, health care, health constraints, type and method of medicinal plants used to treat chicken disease, losses due to diseases, predator attack, etc. A single observation was made on chicken management and biosecurity, while a group discussion was used to identify diseases. Farmers describe diseases by their local name and symptoms that were previously defined in the questionnaire format.

The Statistical Analysis System (SAS) software [11] was used to enter and analyze the data. Descriptive statistics (mean, frequency and percentage) were also used to review the data.

3. Results

3.1 Chicken flock and house management

Of 162 household respondents, most of them kept local or indigenous chicken (49%) followed by indigenous and cross (42%) and exotic chicken breeds (8.8%). About 58% of the rural household respondents explained that they own chicken flocks between 4 and 15 birds, while the average was 9 birds/household. During this survey study, it was confirmed that about 33% of the household flock holdings ranged between 16 and 50 birds, while the average holding per a household was about 28 birds but exclusively hybrids. The holding size by the 8.8% was more than 50 birds, mainly exotic chicken with an average of 149 chicken flocks. Despite this, about 91% of households in the study area practiced free-range scavenging production system. The proportion of chicks and grower in the study flock samples was 24.5%, followed by adults about 18%, while adults and chicks together accounted for 57%.

Extra feed and water are rarely provided. This includes kitchen leftovers and some supplementary feeds. About 42% of chicken-rearing households explained that they

Factors	Category	Number of household respondents	Percent of household respondents
Breed	Local	78	49.05
	Local and cross	67	42.14
	Exotic	14	8.81
Flock size/average	4–15 (9)	92	57.8
	16–50 (28)	53	33.33
	51–300 (149)	14	8.81
Age group	Chicks and grower	39	24.53
	Adult	29	18.24
	Chicks and adult	91	57.23
House	Simple shade	66	41.51
	Shared with family	70	44.03
	Separate house	21	13.21
	Tree and roof	2	1.26
Care	Women	117	73.58
	Men	17	10.69
	Children	7	4.40
	Other	18	11.32

Table 1.
Flock and house management of small-scale and backyard chicken production.

keep their chickens in a simple shade, 44% of them share the same house with the chickens, 13% uses separate house, and 1% uses the birds to nest on the trees and roofs. According to a single visit done in some areas like Jimma, households kept chicks in haybox brooder during brooding time. About 74% of the respondents agreed that women are highly responsible for managing and caring the chickens, while 10.7% reported that men are responsible for the care of chickens. Children and other relatives also contribute in taking care of chickens for 4 and 11%, respectively (**Table 1**).

3.2 Disease occurrence

This study confirmed the prevalence of a number of poultry diseases. Farmers have thus reported a number of diseases based on clinical signs. Poultry diseases were previously described by their clinical sign and/or local names and then later translated to their scientific names (**Figure 3**). Newcastle disease is the most severe infectious disease reported. The overall frequency of Newcastle disease (NCD) occurrence was reported as 64%, gastrointestinal infection 34%, respiratory syndrome 22%, internal and external parasites 16%, coccidiosis 15%, and fowl pox 5%.

3.3 Village chicken health management

Of the interviewed village chicken households, 91.5% of the farmers had no awareness how to manage village chicken diseases. In the present study,

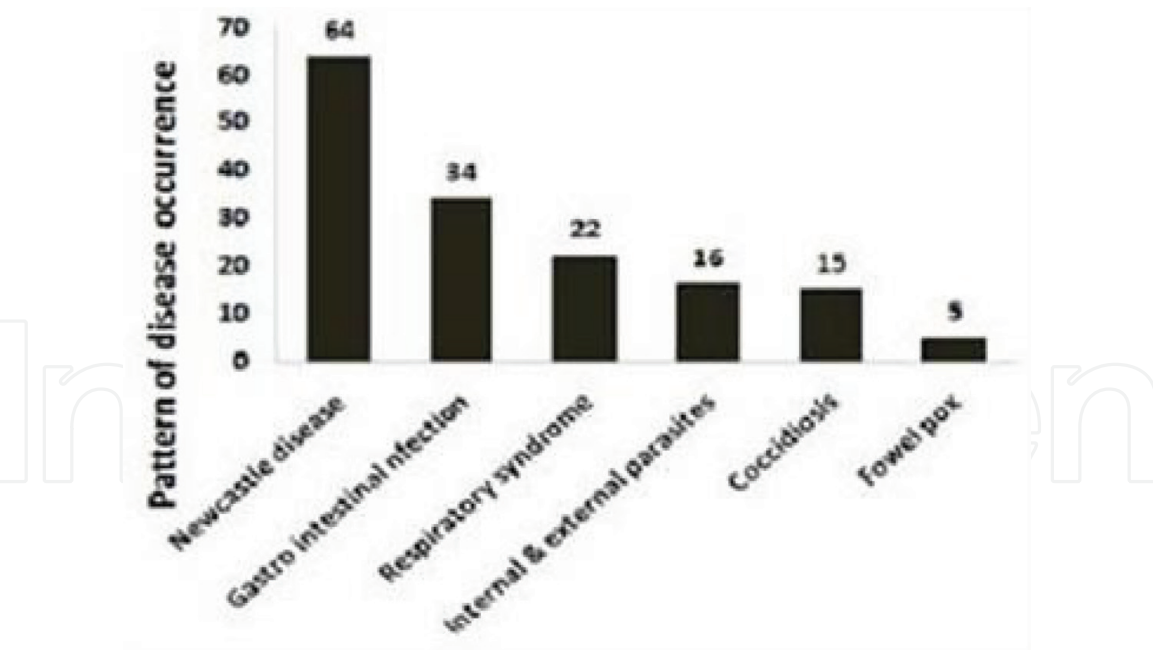


Figure 3.
Pattern of disease occurrence.

about 84% of household chicken flocks were not vaccinated. Some interviewed households (15.7%) reported that their chickens were vaccinated, but no routine vaccination campaigns against any poultry diseases are done by the official veterinary services to control backyard chicken diseases except to some outbreaks of Newcastle disease (Table 2).

Drugs and herbs used by village poultry household respondents during poultry disease outbreak to treat infected chickens were reported to be ineffective (55%) and sometimes effective (14.8%). Majority of village poultry households explained that they visit human pharmacy and/or apply traditional medicine (51%), while some of them visit veterinary clinic, sale infected birds, and do nothing during poultry disease outbreak.

3.4 Cause of chicken mortality and season of diseases occurrence

According to 29.6, 27, and 10% of the respondents, they replied that quarter, more than half, and all chickens died due to diseases, respectively, while 10, 13.8, and 8% of them replied that quarter, more than half, and all died due to predators attack, respectively (Table 2). Newcastle disease, respiratory diseases, and fowl pox outbreaks were reported to occur during the short rainy season: February, March, April, and May. Gastrointestinal infections, respiratory diseases, parasitic infestation, and coccidiosis were also frequently reported to occur during the long rainy season: June, July, August, and September. High disease occurrence was reported in long rainy season (59%).

3.5 The use of traditional poultry medicines

A total of 19 medicinal plants were reported as being used locally for the treatment of various chicken diseases as a traditional medicine. They use the leaf and the fruit (seeds) materials from the plant parts. The species of plants commonly used by smallholder farmers as a traditional medicine to treat scavenging chickens against some diseases are *Allium sativum*, *Allium cepa*, *Aloe vera*, *Azadirachta indica*, *Capsicum frutescens*, *Carica papaya*, *Citrus limon*, *Coffea arabica*, *Eucalyptus*

Parameters	Study areas								
	Amhara		Benishan-gulGumuz	Tigray	Southern region		Oromia		Over all
	Kombolcha Debre Berhan		Asosa	Mekelle	Hawassa Yirgalem		Jimma Haramaya		
Awareness %									
Yes	27.7	71	0.0	10.5	10.0	4.8	0.0	7.7	8.5
No	72.2	92.9	100.0	89.5	90.0	95.2	100.0	92.3	91.5
Vaccination %									
No	50.0	100.0	90.0	63.2	90.0	80.9	100.0	100.0	84.3
Yes/none schedule	50.0	0.0	10	36.8	10.0	19.0	0.0	0.0	15.7
Treatment effect %									
Not effective	44.4	35.7	15.0	47.4	90.00	71.4	47.6	88.5	55.0
Effective	27.8	64.3	35.0	47.4	10.0	23.8	42.9	11.5	32.8
Sometimes effective	27.8	0.0	50.0	26.3	0.0	4.8	9.5	0.0	14.8
Proportion of sick chickens %									
No	5.6	71	5.0	26.3	35.0	28.6	14.3	34.6	19.5
Quarter	16.7	28.6	40.0	52.6	5.0	33.3	9.5	26.9	26.5
More than half	61.1	57.1	25.0	10.5	45.0	23.8	47.6	23.1	36.6
All	16.7	71	30.0	10.5	15.0	14.2	28.6	15.4	17.1
Mortality due to diseases %									
No	11.1	14.3	15.0	63.2	60.0	42.9	23.8	34.6	33.1
Quarter	16.7	35.7	55.5	21.0	15.0	38.0	23.8	30.8	29.6
More than half	55.6	42.9	20.0	5.3	15.0	9.5	42.9	26.9	27.3
All	16.7	71	10.0	10.5	10.0	9.5	9.5	7.7	10.1
Mortality due to predators %									
No	77.8	28.6	25.0	68.4	75.0	66.7	100.0	100.0	67.6
Quarter	16.7	14.3	25.5	15.8	5.0	4.8	0.0	0.0	10.2
More than half	5.6	35.7	30.0	10.5	15.0	14.2	0.0	0.0	13.8
All	0.0	21.4	20.0	5.3	5.0	14.2	0.0	0.0	8.2
Season of disease occurrence %									
Not known	16.7	0.0	0.0	10.5	0.0	0.0	0.0	0.0	3.4
Short/long rainy season	11.1	0.0	0.0	5.2	15.0	4.8	9.5	23.0	8.6
Short rainy season	33.3	71	80.0	10.5	25.0	28.6	23.8	23.1	28.9
Long rainy season	38.9	92.9	20.0	73.7	60.0	66.7	66.7	53.8	59.0

Table 2.
Chicken health management in selected areas of Ethiopia.

globulus, *Lantana camara*, *Lepidium sativum*, *Moringa stenopetala* and *Moringa oleifera*, *Nicotiana tabacum*, *Phytolacca dodecandra*, *Punica granatum*, *Ruta chalepensis*, *Vernonia amygdalina*, and *Zingiber officinale* (**Tables 3 and 4**). The main forms of administration are oral and local.

Family	Species	Disease/symptoms	Part used	Citation
Liliaceae	<i>Allium cepa</i> Linn	RD	Bulb	12
Liliaceae	<i>Allium sativum</i>	GID, NCD, and RD	Crushed bulb	40
Asphodelaceae	<i>Aloe vera</i> (L.)	Diarrhea, NCD, and RD	Leaf juice	5
Meliaceae	<i>Azadirachta indica</i>	Diarrhea	Leaf	25
Solanaceae	<i>Capsicum frutescens</i>	Diarrhea and NCD	Fruit	32
Caricaceae	<i>Carica papaya</i>	Coccidiosis and internal parasites	Leaf, fruit, and seed	10
Rutaceae	<i>Citrus limon</i> (L.)	Diarrhea and RD	juice	46
Rubiaceae	<i>Coffea arabica</i>	Diarrhea	Roasted and powdered coffee	7
Myrtaceae	<i>Eucalyptus globulus</i>	RD and depression	Fresh leaves	4
Verbenaceae	<i>Lantana camara</i>	White diarrhea	Fresh leaves	6
Brassicaceae Cruciferae	<i>Lepidium sativum</i>	Coccidiosis and diarrhea	Seed powder	40
Moringaceae	<i>Moringa oleifera</i>	Diarrhea and poor growth	Fresh leaves	6
Moringaceae	<i>Moringa stenopetala</i>	Diarrhea and poor growth	Fresh leaves	8
Solanaceae	<i>Nicotiana tabacum</i>	Skin problems (pox)	Fresh leaves	3
Phytolaccaceae	<i>Phytolacca dodecandra</i>	Skin problems (scabies)	Fresh leaves	6
Punicaceae	<i>Punica granatum</i>	Diarrhea, coccidiosis, and infectious diseases	Fresh leaves and fruits	5
Rutaceae	<i>Ruta chalepensis</i>	Diarrhea and depression	Fresh leaves	3
Asteraceae	<i>Vernonia amygdalina</i>	Diarrhea, coccidiosis, and GID	Fresh leaves	10
Zingiberaceae	<i>Zingiber officinale</i>	RD (cough/cold) and depression	Rhizome	10

GID, gastrointestinal disease; NCD, Newcastle disease; RD, respiratory disease.

Table 3.
Herbal medicines used to control village poultry diseases/symptoms in the study areas.

Zones	Species
Kombolcha	<i>Allium sativum</i> , <i>Allium cepa</i> , <i>Capsicum frutescens</i> , <i>Citrus limon</i> , <i>Lepidium sativum</i> , <i>Moringa</i> , <i>Punica granatum</i>
Debre Berhan	<i>Allium sativum</i> , <i>Allium cepa</i> , <i>Capsicum frutescens</i> , <i>Citrus limon</i> , <i>Lepidium sativum</i> , <i>Moringa</i>
Benishangul-Gumuz	<i>Allium sativum</i> , <i>Allium cepa</i> , <i>Carica papaya</i> , <i>Capsicum frutescens</i> , <i>Azadirachta indica</i>
Tigray	<i>Allium sativum</i> , <i>Allium cepa</i> , <i>Azadirachta indica</i> , <i>Capsicum frutescens</i> , <i>Citrus limon</i> , <i>Lepidium sativum</i> , <i>Moringa</i> , <i>Vernonia amygdalina</i>
Hawassa Zuria	<i>Allium sativum</i> , <i>Allium cepa</i> , <i>Azadirachta indica</i> , <i>Capsicum frutescens</i> , <i>Citrus limon</i> , <i>Eucalyptus globulus</i> , <i>Lepidium sativum</i> , <i>Moringa</i> , <i>Punica granatum</i> , <i>Ruta chalepensis</i> , <i>Vernonia amygdalina</i>
Yergalem	<i>Allium sativum</i> , <i>Capsicum frutescens</i> , <i>Citrus limon</i> , <i>Lepidium sativum</i> , <i>Ruta chalepensis</i> , <i>Zingiber officinale</i>
Jimma	<i>Allium sativum</i> , <i>Allium cepa</i> , <i>Capsicum frutescens</i> , <i>Citrus limon</i> , <i>Coffea Arabica</i> , <i>Lepidium sativum</i> , <i>Punica granatum</i> , <i>Vernonia amygdalina</i> , <i>Zingiber officinale</i>
Haramaya	<i>Allium sativum</i> , <i>Aloe vera</i> , <i>Capsicum frutescens</i> , <i>Citrus limon</i> , <i>Eucalyptus globulus</i> , <i>Lantana camara</i> , <i>Lepidium sativum</i> , <i>Phytolacca dodecandra</i> , <i>Punica granatum</i> , <i>Vernonia amygdalina</i> , <i>Zingiber officinale</i>

Table 4.
Herbal medicines reported in each zone.

4. Discussion

According to the present finding, most of the household respondents kept indig-enous chicken (49%) followed by indigenous and cross (42%) and exotic chicken breeds (8.8%). These fall within the national agricultural sample survey report of Central Statistical Agency [2]. The report explains the distribution of the national chicken population comprising 96.9, 2.4, and 0.8% of indigenous, hybrid, and exotic chickens, respectively. About 58% of the rural household respondents explained that they own chicken flocks between 4 and 15 birds, while the average was 9 birds/house-hold. This was consistent with the report of Tsegaw et al. [12] in the northwest part of Ethiopia, who reported flock size of 9 in the range of 2–30 birds per household. The holding size by 8.8% was more than 50 birds mainly exotic chicken with an average of 149 chicken flocks. This was observed in the urban and peri-urban areas, with households practicing small-scale semi-intensive and intensive production system. This is in agreement with the report of Demeke [10], who reported that intensive systems with a small number of exotic breeds of chicken (50–1000) are rising in the urban and peri-urban areas of the country, located in strategic areas close to market destinations. Despite this, about 91% of households in the study area practiced free-range scavenging production system. The proportion of chicks and grower in the study flock samples was 24.5%, followed by adults about 18%, while adults and chicks together accounted for 57%. Generally, most households kept chicken of all ages. These are in agreement with the observation of Sonaiya and Swan [13], who reported that free-range chicken flocks usually comprise different species of all ages.

It was found that management is generally poor, and extra feed and water are rarely provided. Village chickens scavenge most of the time. Households reported that they feed chickens with kitchen leftovers and some supplementary feeds including available cereal grains (maize, wheat, sorghum) and/or tubers. Housing of chickens varies widely depending on the chicken-rearing households.

This ranges from traditional housing made of grass and maize stalk to wire mesh fences. Chickens are enclosed and housed overnight in order to protect them from thieves and predators. On the other hand, during cropping season in the farming areas, the chickens are housed all day until harvesting in order to prevent them from destroying crops near the household and to protect them from predators. About 42% of chicken-rearing households explained that they keep their chickens in a simple shade, 44% of them share the same house with the chickens, 13% uses separate house and 1% uses the birds to nest on the trees and roofs. This was consistent with the previous result observed in north Gondar by Tsegaw et al. [12], who reported that 68% shares the main house or kitchen, 24% constructs separate shelter, while some birds (7%) perched in wooden materials or stayed overnight on a roof. According to a single visit done in some areas like Jimma, households kept chicks in haybox brooder during brooding time. However, management was generally poor; chicks were water soaked inside the hayboxes and thereby depressed. In order to minimize mortality of young chicks, the households in some areas of the study regions kept chicks close to the mother hens for some days. In terms of gender contribution, the women play the most significant role in feeding the chickens with kitchen leftovers and some supplementary feeds. About 74% of the respondents agreed that women are highly responsible for managing and caring the chickens.

The pattern of disease occurrence in free-range birds is different as opposed to incidences observed in intensive poultry production systems. Village chicken flocks usually consist of diverse species and all ages and are frequently close to the weather, environment, outbreaks of disease, and microorganisms and parasites found in the soil, wild birds, and animals [13]. Accordingly, this study confirmed the prevalence of a number of poultry diseases. Farmers have thus reported a number of diseases based on clinical signs. Newcastle disease is the most severe infectious disease reported. The overall frequency of Newcastle disease (NCD) occurrence was reported as 64%, gastrointestinal infection 34%, respiratory syndrome 22%, internal and external parasites 16%, coccidiosis 15%, and fowl pox 5%. These are supported by previous reports that are confirmed by several authors on backyard chicken flocks in Oromia region, Eastern Shewa (Gimbichu, Lume, and boset) woredas. Dagnachew [14] tested 328 blood samples and found Newcastle disease and fowl typhoid in 23.17 and in 22.87% of the samples, respectively. At the same time, also Yasmin [15] tested 327 blood samples and found mycoplasmosis in 64.5% of the samples. Mycoplasma species are known as the causative agent of chronic respiratory disease (CRD), synovitis, and airsacculitis. A possible explanation for the higher frequency of NCD in the areas of this study might be the difficulty of the local producers to identify NCD simply by the symptoms because NCD-causing virus species are so varied and cause various symptoms (nerves, respiratory, and digestive). Many other diseases also share the same symptoms which as result farmers may report other diseases as NCD. The disease is transmitted through droppings and secretions from the mouth, nose, and eyes of infected chicken. The disease can also spread through mechanical means like shoes, clothing, wild birds, etc. Mortality is more severe in young chickens than older chickens. However, egg production is severely reduced in older chickens [13].

In rural scavenging chicken flocks in those four districts of the Amhara Region, Eshetu et al. [16] also tested 267 fecal samples and found up to 9 different helminth parasites (nematode and cestoda) species in 91% of the samples. In Tiyo woreda, Arsi zone of the Oromia Region, Getachew et al. [17] tested 191 fecal samples from Rhode Island Red chicken breed and local chicken and found coccidian oocysts in 80.7 and 61% of samples, respectively, while Adamu [18] tested fecal samples from

a respective of 88 and 12 small- and large-scale broiler farms located in Central Ethiopia (Debre Zeit, Dukem, Mojo, and Nazareth towns) and found coccidian oocysts in 60% of the farms.

Of the interviewed village chicken households, 91.5% of the farmers had no awareness how to manage village chicken diseases. In general, similar problems were observed on village chicken health management system across all regions. In the present study, about 84% of household chicken flocks were not vaccinated against any poultry diseases. This might be due to the lack of awareness and the difficulty on accessing and handling the vaccine in free-range family chicken production systems. The vaccine dosage may not match to the village chicken flock sizes, which is mostly less than 50 birds; in addition, the lack of basic infrastructure and maintenance of the cold chain in some remote areas is difficult. Some interviewed households (15.7%) reported that their chickens were vaccinated against some outbreaks of Newcastle disease. However, no routine vaccination campaigns are done by the official veterinary services to control backyard chicken diseases. In general, vaccination management and disease control method in the free-range family chicken production systems are difficult (**Table 2**).

Compared to small-scale semi-intensive and intensively kept commercial chickens, drugs and herbs used by village poultry household respondents during poultry disease outbreak to treat infected chickens were reported to be ineffective (55%) and sometimes effective (14.8%). They complain about the ineffectiveness of some of those drugs or herbs used for the treatment of infected chickens or for the control of mortality. This might be due to the absence of vaccination practices (unless vaccinated, viral diseases are incurable), the application of none standardized drugs (drugs prepared for human, unknown dose application, and the use of combination of many drugs or herbal medicines). The veterinary drugs and veterinary service insufficiencies in remote areas and the high cost of veterinary drugs were also reported. Majority of village poultry households explained that they visit human pharmacy and/or apply traditional medicine (51%), while some of them visit veterinary clinic, sale infected birds, and do nothing during poultry disease outbreak.

According to 29.6, 27, and 10% of the respondents, they replied that quarter, more than half, and all chickens died due to diseases, respectively, while 10, 13.8, and 8% of them replied that quarter, more than half, and all died due to predators attack, respectively, in the last 24 months (**Table 2**). However, differences on the rates of mortality were recorded among regions; this agreed with findings of Gueye [19], who reported that farm poultry production systems are related to high mortality (mainly due to Newcastle disease), in tropical Africa. Disease patterns vary according to the season. Newcastle disease is more serious during the dry season [13]. In the present study, household respondents also reported the occurrence of Newcastle disease, respiratory diseases, and fowl pox outbreaks during the short rainy season and the occurrence of gastrointestinal infections, respiratory diseases, parasitic infestation, and coccidiosis in the long rainy season.

Traditional medicine like herbal therapies are widely used by the majority of African people to treat various human and animal diseases, and it is the only choice for most of them since veterinarians working in African rural areas almost remain inaccessible [20]. Most village farmers in the study regions depend on herbal remedies for indigenous poultry health management. A total of 19 medicinal plants were reported as being used locally for the treatment of various chicken diseases as a traditional medicine. They use the leaf and the fruit (seeds) materials from the plant parts. The application is in the form of juice from freshly collected leaves or in the form of powder from dried seeds. The remedies are prepared by grinding both the leaves and the seeds. These herbal medicines can be prepared in a single or combination of two or three

herbs. Of 19 reported medicinal plants, *Allium sativum*, *Capsicum frutescens*, *Citrus limon*, *Lepidium sativum*, and *Azadirachta indica* were the most frequently used herbs. However, the dosage applications are not consistent.

5. Conclusion

The main causes of losses were identified as disease and predator attack. Poor disease prevention and control and the lack of knowledge, management skills, and provision of feed, water, and housing were also identified as the major constraints of poultry production in the study areas. Newcastle disease is the most severe infectious disease reported by the farmers followed by gastrointestinal infection, respiratory syndrome, internal and external parasites, coccidiosis, and fowl pox. During poultry disease outbreak, households reported that they visit human pharmacy and/or apply herbal medicines; however, there is no scientific document available which proves the efficacy and the dosage administration of the medicinal plants or human medicines used to control poultry diseases. Farmers reported the ineffectiveness of some drugs or herbs. No routine vaccination campaigns against any poultry diseases are done by the official veterinary services to control backyard chicken diseases except to some outbreaks of Newcastle disease. Some of small-scale commercial poultry farms located in and around urban and semi-urban areas practiced vaccination program. The free-range management systems make vaccination of chickens difficult. The pattern of disease occurrence varies according to the season. In the present study, household respondents reported the occurrence of Newcastle disease, respiratory diseases, and fowl pox outbreaks during the short rainy season. On the other hand, gastrointestinal infections, respiratory diseases, parasitic infestation, and coccidiosis were reported to occur in the long rainy season. A total of 19 medicinal plants were reported as being used locally for the treatment of various chicken diseases. Better feeding, watering, hygiene, and protection management and control of diseases and mortality are important methods to improve indigenous chicken production at household level. Family chicken producers should be trained on how to improve housing, nutrition, and disease control practices. They should also be supported and experienced on how to reduce the identified constraints through improved biosecurity and vaccination against diseases such as NCD. Efforts should be made to make the delivery of heat-stable and easily administered vaccines and drugs to these remote areas easier and to verify the effectiveness and the dosages of some traditionally used herbal medicines. The veterinary services need to be strengthened to control indigenous chicken diseases at household level. Research and extension efforts should be directed at the identified constraints.

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Conflict of interest

There is no conflict of interest to declare.

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