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Studies on Management Practices and Constraints of Back Yard Chicken Production in Selected Rural Areas of Bishoftu

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Abstract: This survey was conducted with the aim of assessing the flock characteristics, management practices and performance of indigenous chickens kept under backyard chicken production system from November 2013 to May 2014 in rural areas of Bishoftu, East Shewa, Ethiopia. A total of 160 selected respondents were included in the study from four purposively selected kebeles viz. Filtino, Dalota, Kality and Gote. An overall average flock size (Mean±SD) was 19.9±7.9 birds in the study area. About 35% of the respondents provide separate house to their birds. Majority of the respondents 70% in study area were using scavenging with additional supplements, out of which 56.3% of respondents were using food left over, frushika, maize and sorghum and 13.7% of respondents were using maize and frushika. Tap water was a major source in Dalota (100%) and Gote (67.5%) whereas river water accounts 62.5% as water source in Kaliti kebeles. About 55.6% of respondents use plastic ware for watering the birds. Major source of chicks was natural hatching (46.87%). Overall mean performance of the indigenous chicken in Bishoftu area for age at first lay, number of eggs laid/ hen/ clutch, numbers of clutches per hen/year, number of eggs laid/ hen/ year, number of eggs incubated/hen/clutch, number of eggs hatched/hen/ year, hatchability on the basis of eggs incubated and chicken mortality to an age of 8 weeks in the study area were found as 5.49±0.8 months, 13.18±3.5 eggs, 3.30±0.5 clutches, 44.20±9.6 eggs,10.92±3.1 eggs, 28.42±6.7 eggs, 72.10±5.5%, 27.52±4.7% respectively. The hatchability and mortality were significantly different ($p<0.05$) among four kebeles under study. The mortality of chicks was cited as major constraint in backyard chicken production in the area of study followed by diseases, predation and improper veterinary service at village level. Therefore, efforts should be geared towards the improvement of health and management practices to improve rural backyard chicken production.

Key words: Poultry · Management · Performance · Constraints · Bishoftu

INTRODUCTION

The word poultry refers to all domesticated birds kept for the production of eggs and meat for human consumption including domestic fowl (chicken), turkeys, ducks, geese, guinea fowls, ostriches and others [1]. Despite the rapid development of commercial poultry production systems worldwide, it has been estimated that more than 80% of the global poultry population occurs in traditional family-based production systems and contribute up to 90% of the total poultry products in many countries [2]. In many developing countries, particularly Africa, poultry production in rural and peri-urban areas is based on traditional scavenging systems. It is estimated that about 80% of the Africa's poultry population is found in traditional production systems [3]. The system is characterized by a family ownership of the birds. The birds are then left to scavenge to meet their nutritional needs. The feed resources vary depending on local conditions and the farming system. Housing may not also be provided [4].

Poultry production is deeply embedded in Ethiopian society kept by all strata of society from the landless rural poor to the well off in the cities [5, 6]. In the Ethiopian context poultry effectively means domestic chicken. Out of a total of 44.89 million chickens in Ethiopia, the traditional back yard poultry production accounts for about 98% mainly indigenous birds (96.6%) [7] and

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contributes to more than 90% of the national chicken meat and egg output [8]. Indigenous chickens are nine descriptive breeds closely related to the Jungle fowl and vary in color, comb type, body conformation and weight. There is no separate poultry house and chickens live in family dwellings. The mean annual egg production of indigenous chickens is estimated at 60 small eggs with thick shell and deep yellow yolk color [9].

In Ethiopia poultry production systems show clear distinction between traditional low input system on the other hand and modern production systems [1]. The traditional poultry production system comprises of the indigenous dwellings together with human beings. There is no purposeful feeding of chickens and scavenging is almost the only source of diet. There is no designed selection and controlled breeding. It is by natural incubation and brooding that chicks are hatched and raised all over the rural Ethiopia. Prevalence of predators in the area, such as birds of prey, pets and some wild animals, all of which are listed as the major causes of premature death of chicks in Ethiopia. Diseases are the most important cause of economic loss since vaccination occurs only in response to an outbreak in the traditional poultry production system. The modern poultry sub-sector comprises of the small scale intensive and large scale commercial production systems. There are several private large scale commercial poultry farms in and in the vicinity of Addis Ababa, the majority of which are located in Bishoftu, Elfora, Alema and Genesis are the top 3 largest commercial poultry farms with modern production and processing facilities [10].

Traditional production system is advantageous due to free feed resources in the surrounding environment and kitchen leftovers, use of local breeds that are adapted to their environment and preserved ability to incubate and brood naturally. However, poor reproductive performance, poor growth rates, diseases, mortality, predation and low level of literacy among farmers are some of the major constraints in backyard chicken production [11]. To date, there are limited studies conducted in rural area of Bishofu targeting comprehensive description of the flock characteristics, production performance, associated constraints and management practice of backyard chicken in rural communities. Therefore this study was done with the objectives to characterize the flock structure and management practices, evaluate the productivity and in order to identify the prevailing constraints of backyard chicken production in the rural areas of Bishoftu.

MATERIALS AND METHODS

Study Area and Animals: The study was conducted in selected rural area of Bishoftu, in all backyard rural poultry kept by the farmers including local breeds, exotic and hybrid breeds. Bishoftu is located 45 kilometers south east of Addis Ababa. The area is located at 9°N latitude and 40°E longitudes at an altitude of 1850 meters in central high land of Ethiopia. Study area includes Filtino, Dalota, Kaliti and Gote Kebeles of Bishoftu, East shewa zone, Ethiopia. It has an annual rainfall of 866mm of which 84% is in the long rainy season (June to September). The dry season extends from October to February. The mean annual maximum and minimum temperatures are 26°C and 14°C respectively, with mean relative humidity of 61.3% [12]. Farmers in the vicinity of Bishoftu use a mixed crop and livestock farming system. Moreover, Bishoftu and its surrounding have variable and yet representative agro-ecologies of the country. These agro-climatic zones are inhabited with different plant and animal species [13].

Study Design and Sampling Procedure: The survey work was carried out from November 2013 to May 2014. A total of 160 households, made up of 40 households each from Filtino, Dalota, Kaliti and Gote kebeles, were purposely selected. The selection was carried out based on the accessibility easy of logistic and nearness to Bishoftu town. These four kebeles were approximately 8kms apart. During the study period only those farmers who owned chickens and were willing to participate in this study were considered. The total households included in the study were determined according to the formula given by Arsham [14].

$$N=0.25/SE^2$$

where, N= Sample size, SE= Standard error

Thus, using the standard error of 0.04 with 95% confidence level, 160 households were included in the study.

Data Collection: Data of households were collected by using semi-structured questionnaire and individually interview in order to obtain quantitative data. Direct observation of flocks, feeding and watering practices and poultry houses was carried out during the survey period. Information regarding the types of poultry reared, flock

size and composition, production and reproduction performance, management practices, provision of additional feed, vaccination, use of modern medication and constraints of backyard chicken production system were recorded using the questionnaire survey.

Data Management and Analysis: The data were entered using Microsoft excel spreadsheet and analyzed using SPSS (Version, 20). Descriptive statistics were employed for describing management practices in each kebeles. Differences in productive performances were compared using means generated from one-way ANOVA.

RESULTS AND DISCUSSION

Household Characteristics: The observations recorded for households characteristics for sex ratio in respondents (Figure 1) revealed higher proportion of female respondents than males in all four kebeles under study. This reflected to the fact that village backyard chicken production is mostly managed by females. Similar observations were also reported by Meseret [15]; Muchadeyi *et al*. [16]; Khandait *et al*. [17] and Desalew *et al*. [18]. However, nearly equal proportion of males (49.5%) and females (50.5%) were reported in the South part of Ethiopia [19]. Analysis of educational status (Figure 2) observed under the present study revealed that on overall basis about 37% of the respondents in the study area were illiterates and this observation was in agreement with the report of Desalew *et al*. [18] who has observed about 33.4% of the respondents in Lume district were illiterates. However, a better education status was reported by Mekonnen [19] with only 6.9% of illiterate respondents in south part of Ethiopia.

Flock Size and Structure: The overall mean flock size per household (Table 1) was 19.9 and ranged from 5-49 in the present study. This finding is in consistent with the reports from Philippines [20] and Uganda [21] who reported the mean flock sizes of 19 and 18 for village chicken production system, respectively. However, the present flock size is higher than the reported flock size of

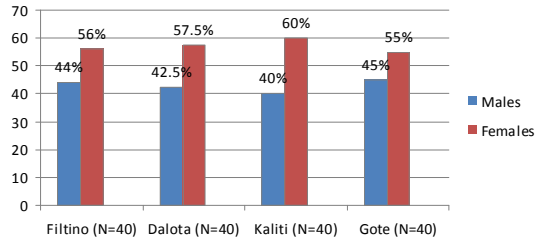

Fig. 1: Sex ratios of respondents in four kebeles in study area

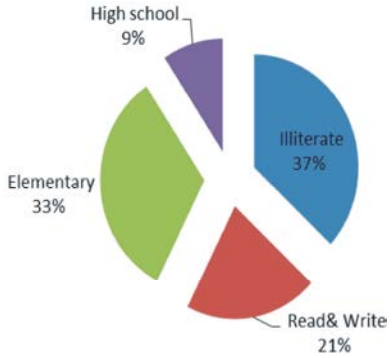

Fig. 2: Educational level of the respondents of the study area

9.2 by Mekonnen [19] in southern part of Ethiopia, 7.1 by Halima [22] in northwest Ethiopia, 8.8 by Asefa [23] around Hawassa and 6.2 by Meseret [15] in Gomma Wereda, Jimma Zone, Ethiopia. In contrast, the mean flock size recorded in this study was lower than the mean flock size of 22 reported by Khalafalla [24] in Sudan, for village chicken production system. The backyard indigenous chicken population of study areas were dominated by chicks (9.9±4.98) followed by hens (3.9) which was higher than 3.8 and 2.5 the corresponding figures for chicks and hen respectively reported by Mekonnen [19] in southern part of Ethiopia. The present result revealed mean of 1.8±1.5 and 2.0±1.3 cocks and cockerels which is the lowest in flock size. The lower proportion of the cockerels and cock observed within the indigenous chicken population in this study was in agreement with report of Meseret [15] and this might be attributed to the selling of cockerels and cocks. Flock size and composition vary

Table 1: Flock structure (Mean±SD) in four kebeles in study areas

		Flock structure						
Kebeles	Sample size(n)	Chicks 0-8wk	Pullets 9-20wk	Cockerels 9-20wk	Hens >20wk	Cocks >20wk	Overall Flock size	Range
Filtino	40	9.70±5.1	2.32±1.32	1.95±1.1	3.3±2.6	2.1±1.2	19.4±7.0	7-42
Dalota	40	7.60±3.9	2.2±1.30	2.01±1.7	3.9±2.5	1.75±1.2	17.8±6.6	7-35
Kaliti	40	10.25±4.3	3.0±1.85	2.1±1.9	3.3±2.0	1.67±1.1	20.4±6.5	9-32
Gote	40	10.90±6	2.5±1.60	1.9±1.21	5.1±1.21	1.7±1.3	22.1±10.3	5-49
Overall	160	9.90±4.98	2.5±1.50	2.0±1.3	3.9±3.5	1.8±1.2	19.9±7.9	5-49
P- value		0.058	0.082	0.955	0.083	0.483	0.105	

Table 2: Poultry Housing system and facility used in the study area

	Kebeles				
Parameter	Filtino	Dalota	Kaliti	Gote	Overall
Poultry house	Fre (%)	Fre (%)	Fre (%)	Fre (%)	Fre (%)
Share same house with people	5 (12.5)	9 (22.5)	12(30.0)	13(32.5)	39(24.4)
Night shelter only	6 (15.0)	14(35.0)	7(17.5)	11(27.5)	38(23.8)
Separate house	18(45.0)	12(30.0)	16(40)	10(25.0)	56(35.0)
With other animals	11(27.5)	5(12.5)	5(12.5)	6(15.0)	27(16.9)
Litter materials					
Teff straw	12(30.0)	8(20.0)	9(22.5)	11(27.5)	40(25.0)
Teff and wheat straw	6(15.0)	3(7.5)	4(10.0)	3(7.5)	16(10.0)
No litter	22(55.0)	29(72.5)	27(67.5)	26(65.0)	104(65)

Table 3: Poultry feeding system in four kebeles under study areas

		Kebeles				
Variable category		Filtino (N=40)	Dalota (N=40)	Kaliti (N=40)	Gote (N=40)	Cumulative (N=160)
Feeding method	Fre (%)	Fre (%)	Fre (%)	Fre (%)	Fre (%)	
	Only scavenging	11 (27.5)	12(30.0)	9 (22.5)	16 (40)	48(30.0)
	Scavenging with supplement	29(72.5)	28(70.0)	31(77.5)	24(60.0)	112(70.0)
Type of supplement						
	Maize and Frushika	6(15.0)	5 (12.5)	7(17.5)	4(10.0)	22(13.75)
	Food left overand others*	24(60)	22(55)	24(60)	20(50)	90(56.25)
Time of feeding						
	Morning and Evening	8 (20.0)	6(15.0)	6(15.0)	3(7.5)	23(14.4)
	Morning and afternoon	11 (27.5	9(22.5)	9(22.5)	12(30)	41(25.6)
	Morning, afternoon and evening	10(25.0)	13(32.5)	16(40.0)	9(22.5)	48(30.0)

Others*= Frushika, Maize, sorghum

over time; however, it is a function of disease incidence, predators and the occurrence of festivals which induce high rates of off-take through household consumption and sale [25].

Poultry Housing System and Facility: The observations on poultry housing and facilities (Table 2) indicated that 45% of the respondents in Filtino, 40% in Kaliti, 30% in Dalota and 25% in Gote Kebeles with an overall average of 35% in study area constructed separate house entirely for poultry which were higher than 22.1% reported by Leta and Bekana [26] in Mid Rift Valley of Oromia, Ethiopia; 14% by Moges *et al*. [27] in Bure district and 21.2% by Mengesha *et al*. [28] in north west Ethiopia, 5.6% by Meseret [15] in Gomma Wereda, 24.4% by Fentie *et al*. [29] in north Gondar and 11.5% by Tadelle and Ogle [30] village poultry production systems in the central highlands of Ethiopia who have constructed separate shelter for their bird. In contrary, Mekonnen [19] reported that there were no specific separate poultry houses in Dale Wereda. The present overall average for separate poultry housing and facilities under this study was significantly lower than 91.1% in Ada'a and 95.6% in Lume districts Desalew *et al*. [18] and 90% in Bhandara district of India Khandait *et al*. [17], reported of backyard chicken owners provided separate poultry house. However, the present observation for Filtino Kebele (45%) is nearly similar to the report of 48% Zewdu *et al*. [31] in Metekel zone, Northwest Ethiopia. This significant variation might be associated to the farmers' awareness to the importance of poultry housing.

Among the households who have no separate poultry houses, about 15.0%, 35.0%,17.5%, 27.5% of the respondents in Filtino, Dalota, Kaliti and Gote kebeles respectively, indicated that their birds perch in the kitchen and on trees during night time (Table 2). Leta and Bekana [26] reported 1.4% of the respondents use part of the kitchen and 26.6% of the chicken perches on tree in Mid Rift Valley of Oromia, Ethiopia. Also there are reports of 58% and 68% of the chicken share the main house with family in Mid Rift Valley of Oromia, Ethiopia [26] and in north Gondar [29] respectively, which was higher than the present finding of 24% under the study area. Lack of knowledge and awareness and poor attention to village chicken production may be some of the reason for not constructing separate chicken house.

Poultry Feeding Practices: The results for feeding practices (Table 3) revealed that an overall of 70% of the respondents in study area of four kebeles in rural area of

Table 4: Poultry watering system in four kebeles under study area

Source and frequency of water		Kebeles				
		Filtino	Dalota	Kaliti	Gote	
Source	Fre (%)	Fre (%)	Fre (%)	Fre (%)	Overall	
	River water	19(47.5)	0 (0.0)	25(62.5)	10(25.0)	54 (33.8)
	Tap water	5(12.5)	40(100)	5(12.5)	27(67.5)	77(48.1)
	River and Tap water	16(40.0)	0 (0.0)	10(25.0)	3(7.5)	29(18.1)
Frequency						
	Free access	28(70.0)	21 (52.5)	7(17.5)	22(55.0)	78(48.8)
	Morning only	9(22.5)	16 (40.0)	22(55.0)	9(22.5)	56(35.0)
	Morning and evening	3 (7.5)	3(7.5)	11(27.5)	9(22.5)	26 (16.3)
Facility						
	Broken clay	11(27.5)	8(20.0)	7(17.5)	6(15.0)	32(20)
	Plastic	21(52.5)	22(55.0)	22(55.0)	24(60)	89(55.6)
	Wooden through	8(20.0)	10(25.0)	11 (27.5)	10(25.0)	39(24.4)

Bishoftu practice scavenging system with supplementary feeding which was not in agreement with 97.8% reported by Desalew *et al*. [18] in East Shewa; 95% by Asefa [23] in Hawassa zuria; 98.1% by Mekonnen [19] in South Ethiopia; 98% by Leta and Bekana [26]; 99% by Halima [22] in North West Ethiopia; 97.5% by Moges *et al*. [27]; 98% by Mengesha *et al*. [28]; 92.5% by Zewdu *et al*. [31] in Metekel zone and 97.25% by Khandait *et al*. [17] in India, backyard chicken owners provide additional supplement.

The major supplementary feed in the surveyed area includes frushika, maize, sorghum and food leftover used by about 56.25% of the respondents in the study area. Mekonnen [19] reported feeding practice of maize (6.3%), frushika (1.2%) and frushika (6.3%) in south part of Ethiopia. This study also revealed that out of 70% respondents supplementing feed to their chicken about 14.4% supplements twice a day (usually morning and evening), 25.6% twice a day in morning and afternoon and 30% supplement their chicken three times a day usually morning, afternoon and evening (Table 3). According to the report of Mekonnen [19] about 45.6% of respondents supplement twice a day (usually morning and evening) and only13.8% of them provide three times a day.

Poultry Watering System: It is revealed from Table 4 that all respondents used tap water in Dalota (100%) to their chicken, whereas river water (62.5%) was the major water source in Kaliti kebeles. On overall basis about 48.13% used tap water, 33.75% respondents used river water and 18.13% respondents used both river and tap water to their chicken in the study area. Higher number of respondents used tap water in Dalota than other kebeles; this indicates the availability of better water infrastructure in Dalota than other kebeles. Leta and Bekana [26] reported use of 66% tap water which is higher than the present results (48.13%). However, Leta and Bekana [26] reported 15% of river water in Mid Rift Valley of Oromia, Ethiopia which is lower than 33.75% observed in the present study. The results for watering practices (Table 4) in four kebeles under study, revealed that on overall basis about 48.75% of respondents in the present study provided water to their chicken with free access which is in agreement with the report from Mid Rift Valley of Oromia, Ethiopia (47%) [26], but lower than the report in village chicken production from East Shewa, Ethiopia (95.6%) [18]. Concerning the water drinkers, 55.6% respondents used plastic containers as water drinkers to their back yard chicken in the study area and agreed with the study conducted in South part of Ethiopia (56%) [19].

Source of Chicks: The results for source of chicken procurement (Table 5) revealed that an overall of 21.88% respondents purchased chicks from private/ government hatcheries which were not in agreement with the reports of Desalew *et al.* [18] in Ada'a (84.4%) and Lume districts (80%) purchased chicks from private hatcheries. This study also revealed that about 52.5% respondents in Filtino, 47.5% respondents in both Kaliti and Gote Kebeles and 40% respondents, in Dalota hatched fertile eggs naturally using broody hen at home with an overall average of 46.87% respondents, in study area and this finding is not in agreement with Khandait *et al*. [17] who reported 100% hatching of eggs naturally at home in backyard poultry production at Bhandara district of India. However, only 15.6% and 20% respondents hatched fertile eggs naturally at home in Ada'a and Lume districts, respectively as reported by Desalew *et al*. [18] for village chicken in East Shewa, Ethiopia. In addition this finding also showed that about 27.5%, 35%, 25.0% and 37.5% of

Table 5: Source of the chicks in four kebeles under study area

	Kebeles				
	Filtino (N=40)	Dalota (N=40)	Kaliti (N=40)	Gote (N=40)	Overall (N=160)
Source of the breed (Fre (%))					
Private hatchery	8(20.0)	10(25.0)	11(27.5)	6(15.0)	35(21.88)
Naturally hatched at home	21(52.5)	16(40.0)	19(47.5)	19(47.5)	75(46.87)
Purchased from local market	11(27.5)	14 (35)	10(25.0)	15(37.5)	50(31.25)

Table 6: Performance characteristics of backyard indigenous chickens in the study area

	Kebeles (N=40)						
	Filtino	Dalota	Kaliti	Gote	Overall Mean±SD	Range	P-Value
Parameters	Mean±SD	Mean±SD	Mean±SD	Mean±SD			
Age at sexual maturity(month)	5.68±0.8	5.65±0.86	5.3±0.88	5.32±0.8	5.49±0.8	4-7	0.75
Number of eggs laid per clutch per hen	13.53±3.9	12.8±3.3	13.37±3.2	13±3.14	13.18±3.5	7-20	0.799
Number of clutch/hen/year	3.28±0.45	3.3±0.5	3.35±0.48	3.28±0.4	3.30±0.5	3-4	0.873
Number of eggs laid/hen/year	45.1±10.5	42.65±9.3	44.95±8.8	44.15±10	44.20±9.6	20-60	0.663
No. of eggs incubated/clutch/hen	11.5±3.3	10.5±3.0	10.9±2.59	10.83±3.0	10.92±3.1	6-17	0.454
No. of eggs hatched /hen/year	30.2±7.3	27.2±7.0	28.42±6.2	27.87±6.0	28.42±6.7	15-45	0.234
Hatchability (%)	75.4±5.8	71.13±5.0	70.9±5.1	70.7±5.0	72.10±5.5	57-85.7	<0.001
No. of chicken raised/year/hen	22.8±5.9	19.5±5.27	20.13±4.5	19.75±5.0	20.53±5.3	10-33	0.015
Mortality (%)	24.8±4.8	28.38±4.2	29.69±4.3	27.2±3.9	27.52±4.7	14-40	<0.001
Survivability of chicks (%)	74.7±4.7	71.62±4.2	70.49±4.2	73±3.99	72.45±4.5	60-85.7	<0.001

respondents in Filtino, Dalota, Kality and Gote Kebeles respectively, with an overall average of 31.25% purchased their chicken from local market which was not in agreement with Nath *et al.* [32] who reported that 74.4% of respondents purchased poultry chicks from the local market in rural tribal areas of Sikkim, India.

Performance Characteristics of Backyard Indigenous Chickens: The performance characteristics of indigenous chickens (Table 6) revealed that overall average age at sexual maturity expressed in terms of age at first egg was observed to be 5.49±0.8 month in the study area and age at first egg did not vary significantly between four kebeles under study. This age at first was lower than 6.33 month reported by Meseret [15] in Gomma Wereda, Jimma Zone, Ethiopia, 7.07 months reported by Mekonnen [19] for indigenous chicken in south part of Ethiopia. The average age at first egg observed in the present study was well within the range (4-7 months) for age at first egg reported by Leta and Bekana [26] for indigenous chicken in Mid Rift Valley of Oromia, Ethiopia.

This study also revealed that overall average number of clutches/ bird/year were 3.30±0.5 with no significant differences between the four kebeles in the study area. These results agreed with Tadelle and Ogle [37], as they have reported 3-4 clutches for indigenous chicken in the central highlands of Ethiopia and Moreki [33] also reported 3-4 clutches for indigenous chicken in Botswana. The present number of clutches/hen/year under present study was lower than 4.3 clutches reported by Fentie *et al*. [29], 5-6 clutches reported by Dessie and Ogle [34]. The overall average number of eggs laid/clutch/hen (clutch size) were observed to be 13.18±3.5 eggs in the study area with non-significant variations between the different four kebeles under study. This average number of eggs/clutch/hen was lower than 15.1 eggs/clutch/hen reported by Fentie *et al.* [29] in North Gondar which could be due to the more number of clutches (4.3 clutches) reported by the same researcher.

The overall mean number of eggs laid per hen per year was recorded to be 44.20±9.6 eggs with the range of 20-60 eggs per year in 3-4 clutches in the present finding. These averages for egg production and number of clutches were lower than annual production of 55-80 eggs per year in 5-6 clutches Dessie and Ogle [34]. However, the recorded value on egg production / hen/ year in present study agreed with Barua and Yoshimura [35] as they have reported 44 eggs for Bangladesh; Ssewannyana *et al*. [21] reported 40 -50 eggs for Uganda for the village chicken production; Fikre [36] reported 36-42 for Ambo wereda and Tadelle and Ogle [37] reported 40-60 egg for the central highlands of Ethiopia.

The average number of eggs incubated / hen at a time was found to be 10.92±3.1 with non-significant variations between the averages observed for four kebeles (Table 6). The average number of eggs incubated / hen at a time

Table 7: Use of anti-ectoparasites and culling practice and in the study area

Variable category		Kebeles				
		Filtino (N=40)	Dalota (N=40)	Kaliti (N=40)	Gote (N=40)	Overall (N=160)
Application of anti ectoparasite	Fre (%)	Fre (%)	Fre (%)	Fre (%)	Fre (%)	
	No	28(70.0)	27(67.5)	22(55.0)	24(60.0)	101(63.13)
	Yes	12(30.0)	13(37.5)	18(45.0)	16(40.0)	59(36.87)
Culling practice						
	No	12(30.0)	15(37.5)	15 (37.5)	12 (30.0)	54(33.75)
	Yes	28(70.0)	25(62.5)	25(62.5)	28(70.0)	106(66.25)

Table 8: Major constraints of poultry production in the study area

Constraints	Kebeles				
	Filtino (N=40)	Dalota (N=40)	Kaliti (N=40)	Gote (N=40)	Overall (N=160)
	Fre (%)	Fre (%)	Fre (%)	Fre (%)	Fre (%)
Presence of disease	16(40.0)	19(47.5)	12(30.0)	14(35.0)	61(38.1)
Predators	10(25.0)	6(15.0)	13(32.5)	8(20.0)	37(23.1)
Inadequate veterinary service	7(17.5)	5(12.5)	5(12.5)	6(15.0)	23(14.4)
Lack of knowledge in poultry rearing	4(10.0)	4(10.0)	3(7.5)	7(17.5)	18(11.3)
Feed shortage	3(7.5)	6(15.0)	7(17.5)	5(12.5)	21(13.1)

under present study is lower than 13.2±1.8 eggs reported by Fentie *et al*. [29] in Small-scale family poultry production in North Gondar. The mean percent hatchability (Table 6) observed for the four kebeles revealed the highest hatchability of 75.4±5.8% in Filtino, followed by 71.13±5.0% in Dalota, 70.9±5.1% in Kaliti and 70.7±5.0% in Gote kebeles where significantly different from each other. The differences in hatchability between four kebeles could be attributed to the season of the year, since hatchability of eggs is affected by season of incubation and agreed with Kitalyi [38]. The overall average hatchability in the present study was observed to72.10±5.5% which is closer to hatchability of 75% reported by Wilson [5]. However, the present hatchability estimate was lower than 84.6% reported by Fentie *et al.* [29] in small-scale family production in North Gondar, 82% hatchability reported by Kusina *et al.* [39] in Zimbabwe, 80.9% hatchability reported by Tadelle and Ogle [37] for Central highlands of Ethiopia and 89.1% reported by Mekonnen [19] for south part of Ethiopia.

The mean percent chicks mortality (to an age of 8 weeks) of the backyard chicken in this survey showed significant differences ($P<0.05$) between kebeles. Accordingly, an overall survivability of chicks was found 72.5±4.5% with significant differences between the study areas. The significant variation in mortality and survivability of chicken between kebeles could be attributed to the season of hatching the chicks, incubation and brooding facilities provided to the broody and measures of protection from predators and scavengers taken by the respondents. The overall mean mortality was found to be 27.5±4.7% in the present study was comparable to the mortality reported in Uganda (25%) by Ssewannyana *et al*. [21] for village chickens in backyard system. However, chick mortality up to 8 weeks of age in the present study was lower than 61% reported by Tadelle and Ogle [37] from the central highlands of Ethiopia; 55% by Mekonnen [19] from Dale wereda and 93% by Brännänng and Pearson [40] from Assela.

Poultry Healthy Management and Source of Chicken: Table 7 revealed that an overall average of 36.87% respondents practiced use of anti-ectoparasites in the present study. This average was lower than 49.6% by Khandait *et al*. [17] in backyard poultry rearing practices at Bhandra district of Maharashtra, used anti-ectoparasites. Village poultry keeping farmers tend to start dealing with disease control once the symptoms appear in their flocks. They therefore treat symptoms instead of diseases and link specific therapeutic preparations to specific disease symptoms [41].

Purposeful culling of chickens (Table 7) was practiced by an overall average of 66.3% respondents in the present study due to various reasons like sickness, poor productivity and old age which is lower than 88.75% reported by Atsbeha [42] in central zone of Tigray; 100% reported by Desalew *et al*. [18] in East Shewa, Ethiopia and 86.9% reported by Mekonnen [19] in south part of Ethiopia. It was also observed that none of the respondents vaccinated their birds against any disease in

four kebeles under study area (Table 8). This observation was in agreement with Leta and Bekana [26]; Khandait *et al*. [17]; Moges *et al*. [27]; Mengesha *et al*. [28] and Takele and Oli [43] as they all have reported that none of the backyard poultry owner practiced vaccination of birds against poultry diseases in different areas of their study. However, Vaccination has been practiced in Lume and Ada'a districts and this was due to the tremendous and coordinated efforts of livestock experts, development agents (DAs) and field veterinarians in both districts Desalew *et al*. [18].

General Constraints on Traditional Backyard Poultry Production: Information collected on constraints in back yard poultry production (Table 8) revealed that disease was the most important problem affecting poultry productivity with an overall average of 38.1% disease incidence in the study area and agreed with the reports of Aini [44] as he has also observed that in the free-range and backyard poultry production system, diseases are the major limiting factor to the production of backyard chickens. This disease incidence was higher than 33.1% incidence of disease reported by Desalew *et al*. [18] in East Shewa, Ethiopia. However, the present disease incidence was lower than 100% higher incidence of disease reported by Khandait *et al.* [17] in Bhandara district of Maharashtra (India).

The signs of the common diseases as perceived by the respondents in the four kebeles were loss of appetite, reduction in drinking and eating, watery and yellowish droppings, paralysis and, consequently, death. This syndrome was called 'fengle' by the community in the study area. This disease, which was probably Newcastle disease, was an acute condition, lasting for only 3-5 days and usually resulted in the death of the whole flock because transmission was very rapid. Outbreaks of this disease usually occurred at the beginning of the rainy season, that is at the end of May and beginning of June, but after villagization it became a problem throughout the year, even though it was still more serious at the beginning of the rainy season. The farmers did not have any preventive medicine or practice for this fatal disease and only treat their birds with accepted traditional medicines after the start of an outbreak. Similarly, Desalew *et al*. [18] and Meseret [15], Mekonnen [19]; Moges *et al*. [27] and Serkalem *et al*. [45] reported Newcastle disease as economically important diseases in North West Ethiopia. Survey from Tanzania indicated that Newcastle is the most devastating disease in village chickens [46].

On the other hand overall average of 23.1% respondents complained the presence of predators in the study area which is higher than 12% respondents complained the presence of predators reported by Desalew *et al.* [18] in East Shewa, Ethiopia. However, the present estimate was lower than 89.17% of the poultry owners facing the problem of attack of predator's reported by Khandait *et al.* [17] in Bhandara district of Maharashtra (India). Predation was reported to be highest in the rainy season because of the high density of vegetation, which attracted and provided cover for predator animals. Common predators were dogs, cats (domestic or wild), eagles, hawk and vultures in this study agreed with Khandait *et al*. [17].

Other constraints include inadequate veterinary services, feed shortage and lack of poultry production knowledge in the study area. Limited veterinary services for village chickens were also reported by Moges *et al*. [27] in North West Ethiopia, Leta and Bekana [26]; Takele and Oli [43] and Mengesha *et al*. [28] in different parts of Ethiopia. Lack of poultry production knowledge was the other constraint in all kebeles and agreed with the report of Moges *et al*. [27] in Ethiopia and Khandait *et al*. [17] in India.

CONCLUSION

Backyard chicken production is playing an important role in increasing socio-economic status of rural community and employment in rural areas. However the backyard chickens suffer low productivity and high mortality. Disease control and improved management in backyard chicken production are lacking in the study area. Diseases followed by predation were found to be the major constraint of backyard chicken production in rural area of Bishoftu. Interventions to improve backyard chicken production could have considerable benefits. This could considerably reduce the losses and maximize the returns which in turn increase off-take rates whether for home consumption or for sale. Therefore animal husbandry and health extension service units should be strengthened to train chicken farmers to increase the level of awareness and benefits from backyard birds. Furthermore, improvements in management by provision of feed and clean water to young chicks, indoor management of chicken and control of diseases and predators and improving the genetic potential should also be promoted. Vaccination schemes should be developed by availing vaccines and training to community vaccinators to carry out vaccinations at kebeles level in a wide coverage.

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