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Assessment of awareness of broiler chicken welfare in Gaborone, Botswana

Moreki, J. C.*, Maphanyane, P. and Manyeula, F.

Department of Animal Sciences, Faculty of Animal and Veterinary Sciences, Botswana University of Agriculture and Natural Sciences, Private Bag 0027, Gaborone, Botswana.

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Abstract Scientific information on broiler chicken welfare in Botswana is scarce. The awareness of poultry welfare in selected commercial broiler farms in Gaborone was assessed. A structured questionnaire was administered to 25 randomly selected farms and through direct observation. Results showed that mainly men (72%) were found actively involved in broiler chicken production. Ninety-six percent of the respondents strongly agreed that animal welfare is an important aspect in commercial poultry production. Furthermore, 64% of the respondents strongly agreed that welfare during transportation was good while 56% of the respondents strongly agreed that overcrowding affects welfare. Additionally, 80% of the respondents strongly agreed that beak trimming affects birds' welfare, whereas 96% agreed that light affects performance of broiler chickens. Eighty-eight percent of the respondents strongly agreed that pre-slaughter management practices affect performance of birds. All the respondents in this study carried out vaccinations. Three heat sources were used during brooding and these are *mbaula*, electric heater and infra-red lamp. These results suggested that there is a need to educate broiler farmers on poultry welfare and how it affects the performance of birds.

Keywords: Disinfection, Monitoring temperature, Stocking density, Stressors, Transportation

Introduction

The welfare of an animal refers to its quality of life, and this involves many different elements such as health, happiness and longevity to which different people attach different degrees of importance (Tannenbaum, 1991). Animal welfare also refers to the well-being of the individual animal. It includes animal health and encompasses both the physical and psychological state of the animal. The welfare of an animal can be described as good or high if the individual is fit, healthy and has a good quality of life, which encompasses both freedom from suffering and opportunity to express positive feelings of well-being [Farm Animal Welfare Council (FAWC), 2008].

The state of welfare may vary from very good to very bad. Duncan and Fraser (1997) stated that sometimes, one component of welfare is good while

* **Corresponding Author**: Moreki, J. C.; **Email:** jmoreki@buan.ac.bw

others are not. It is therefore important to be able to measure each component of welfare. The FAWC (1979) proposed that all farm animals should have (1) freedom from hunger and thirst; (2) freedom from discomfort; (3) freedom from pain, injury and disease; (4) freedom to express normal behaviour and (5) freedom from fear and distress. These Five Freedoms have been accepted by World Organization for Animal Health (OIE) as one of the guiding principles governing animal welfare (Nicol and Davies, 2012). According to Bessei (2006), poultry welfare is affected by genetics, hatching, rearing and adult housing environments, transportation methods and slaughter employed and to a greater extent by the attitudes and standards of care of the stockpersons.

The major welfare issues for commercially reared broilers are leg health problems and lameness, metabolic disorders; and hunger in feed-restricted broiler breeder flocks (Nicol and Davies, 2012). In laying hens, bone problems such as osteoporosis and high incidence of resultant bone fracture, behavioural deprivation occur due to housing in cage systems, unequal access to facilities for birds housed in non-cage systems, and injurious pecking and plumage loss that occur in all types of housing system (Broom, 1986). Other issues arising during transportation and slaughter are high levels of stress due to inappropriate handling, and pain and stress if birds are not properly stunned before slaughter. Intensification without increased labour may result in welfare problems being overlooked. In many developing countries, poultry are raised by women and children. Therefore, learning how to raise poultry to optimal welfare standards can help women to improve their productivity, and this may help alleviate poverty (Nicol *et al*., 2009).

Farm animal welfare is a major issue for the poultry industry and poultry producers globally. Even though few people outside agriculture understand current production practices, increasing numbers are demanding animal welfare assurances for the products they purchase and therefore it becomes difficult in the poultry industry because facilities, management and personal opinions differ between poultry producing regions (Watkins, 2003). There is limited information on poultry welfare in Botswana; hence the need to undertake this study. The objective of this study was to assess poultry welfare status in 25 commercial broiler farms in Gaborone.

Materials and methods

Study site

The study was carried out in Gaborone, the capital city of Botswana. Gaborone is situated at 24°39′29″S 25°54′44″E between Kgale and Oodi Hills, on the Notwane River in the southeastern corner of Botswana, and 15 km from

the South African border. The city lies at an elevation of 1,010 m above sea level, with an average annual rainfall of 81.9 mm. Average daily minimum and maximum temperatures in summer are about 18 ℃ and 32 ℃, respectively and -5 ℃ and 31 ℃ in winter, respectively.

Sampling strategy

A list of commercial farmers was obtained from the Poultry Section of the Department of Animal Production from which 25 farmers were randomly selected and studied. The selection of farms was done using systematic sampling method to ensure that the total population list has not been ordered in a way that introduces any random factors into sampling. The target population for the research was those individuals from commercial farms in Gaborone.

Data collection

Data were collected using structured questionnaire which was administered to randomly selected respondents from 25 farms in Gaborone. A checklist was used where a numerous sets of poultry guidelines were used to observe if broiler chickens were given practices that promoted health and welfare.

Statistical analysis

Data derived from questionnaires and checklist were recorded into the spreadsheet for statistical analysis. Thereafter, data were analyzed using Statistical Package for Social Science (SPSS) and descriptive data such as means, standard deviation, frequencies and percentage were presented using figures and tables.

Results

Socio-economic data

The data on age, position, experience of rearing chickens, gender, nationality, marital status and education level of respondents is presented in Table 1. Sixty-eight percent of the respondents were aged 31-40 years, followed by 41-50 years (16%), 20-30 years and >51 years (8%). Seventy-two percent of the respondents were males while the remainder was female. This implies that in this study men were more involved in poultry production than women probably because they were more economically advantaged than their female

counterparts. Ninety-two percent of the respondents were Botswana citizens (Batswana). Furthermore, 56% of the respondents were married and the remainder single. All the respondents were literate with 68% of them having degree qualifications followed by certificate (24%) (Table 1). The high literacy rate of the respondents indicates that the respondents are likely to understand welfare issues and consume extension messages.

Table 1. Socio-economic data of respondents in the study area

Category	**Frequency (n=25)**	**Percentages**
Age		
20-30 years	2	8.0
31-40 years	17	68.0
41-50 years	4	16.0
>51 years	2	8.0
Experience in rearing		
Less than 1 year	4	16.0
1-5 years	5	20.0
6-10 years	11	44.0
More than 11 years	5	20.0
Gender		
Male	18	72.0
Females	7	28.0
Nationality		
National	23	92.0
Non-citizen	2	8.0
Marital status		
Married	14	56.0
Single	11	44.0
Education level		
Certificate	6	24.0
Diploma	2	8.0
Degree	17	68.0

Knowledge of welfare

Ninety-six percent of the respondents strongly agreed that animal welfare is an important aspect in commercial poultry production while the remainder slightly agreed (Table 2). The authors also stated that the presence of apparently purposeless behaviour of high levels of aggression or redirected behaviours such as feather pecking and cannibalism indicate that the housing system does not meet the behavioural needs of the hens and is therefore not satisfactory for bird welfare.

Sixty-four percent of the respondents strongly agreed that welfare is important during transportation, followed by 28% that moderately agreed and 8% that slightly disagreed. This implies that majority of the respondents had some knowledge of animal welfare (Table 2). The authors suggested that welfare during transportation may be improved by a more holistic consideration of the physiology of the birds, rearing conditions, pre-transport handling and the prevailing conditions and stressors that may be imposed during the journey.

Fifty-six percent of the respondents strongly agreed that overcrowding affects welfare, followed by 40% and 4% that moderately and slightly agreed, respectively (Table 2). This finding indicated that there is need for government extension service to make farmers aware that overcrowding has deleterious effect on poultry welfare, health and productivity. It is, however, worth noting that broilers are not usually debeaked unless they show aggressive behaviour which can be caused by hunger due to delayed feeding. Furthermore, 96% of the respondents agreed that light affects performance of broilers, while the remainder disagreed. Adequate light enables birds to locate feed and water. Earlier experiments have shown that growth rate and feed conversion are better under continuous light than under a natural day-night regime.

Eighty-eight percent of the respondents strongly agreed while 32% moderately agreed that pre-slaughter management practices affect performance of birds, i.e., how birds are handled when they are loaded in crates and also stocking density in crates when birds are taken to slaughterhouse, whereas the remainder (12%) disagreed that pre-slaughter management affects performance of birds. Furthermore, 64% of the respondents strongly agreed that handling of birds affects their welfare, followed by 24% that moderately agreed and 12% that slightly agreed.

Sixty-four percent of the respondents strongly agreed that the amount of feed given to birds affects their welfare followed by 16% that moderately agreed, 8% that slightly agreed and 12% that disagreed.

Only 50% of the respondents mentioned that they had some knowledge of welfare. Thirty-two percent of the respondents mentioned that they acquired knowledge of welfare at school, 8% from work experiences, whereas the remainder acquired welfare knowledge from both school and work experiences. This implies that there is need for extension service to intensify educating farmers on poultry welfare and its influence on bird performance. The author also posits that governments in developing countries in coordination with OIE should conduct semi-annual or annual workshops on poultry welfare concern to improve the awareness.

Table 2. Respondents' knowledge of poultry welfare

Category	Frequency (n=25)	Percentages
Animal welfare is important		
Strongly agree	24	96.0
Slightly agree	1	4.0
Welfare during transport is good		
Strongly agree	16	64.0
Moderately agree	7	28.0
Slightly disagree	2	8.0
Overcrowding affects welfare		
Strongly agree	14	56.0
Moderately agree	10	40.0
Slightly agree	1	4.0
Beak trimming affects the welfare		
Strongly disagree	20	80.0
Moderately disagree	5	20.0
Light affect performance		
Strongly agree	16	64.0
Moderately agree	8	32.0
Strongly disagree	1	4.0
Pre-slaughter management practices affect performance		
Strongly agree		
Moderately agree	14	56.0
Neither agree or disagree	8	32.0
Slightly disagree	2	8.0
Handling of birds affects birds welfare	1	4.0
Strongly agree		
Moderately agree	16	64.0
Slightly agree	6	24.0
Amount of feed given affects welfare	3	12.0
Strongly agree		
Moderately agree	16	64.0
Slightly agree	4	16.0
Strongly disagree	2	8.0
	3	12.0

Health management

All the respondents in this study indicated that they never debeaked broilers, as broilers are kept for a shorter time compared to layers. As mentioned earlier, broilers are not usually debeaked but can only be debeaked when they show aggressive behaviours that result from either late feeding or underfeeding. Seventy-six percent of the respondents vaccinated their birds against Newcastle disease (NCD), infectious bronchitis and infectious bursal disease (IBD); 20% vaccinated against IBD and NCD, whereas the remainder

vaccinated against NCD only. Furthermore, 80% of the respondents vaccinated their birds orally through water, whereas the remainder used both oral and spray vaccinations. In addition, 68% of the respondents vaccinated birds against NCD four times (i.e., days 1, 7, 14 and 21) in a rearing cycle followed by 32% that vaccinated three times (Table 3).

Table 3. Vaccinations carried out on broiler farms in the study area

Age (days) vaccine is administered	Diseases vaccinated against		
	NCD	IBD	Infectious bronchitis
Day old	✓	✓	
7 days	✓		
10 days			✓
14 days	✓	✓	
21 days	✓		✓

NCD = Newcastle disease; IBD = Infectious bursal disease

Nutrition and feeding

In this study, 52% of the respondents fed birds three times a day, *i.e*., morning, afternoon and in the evening followed by *ad libitum* (32%) and twice a day, *i.e*., morning and late in the afternoon (16%). Eighty-eight percent of the respondents fed birds using three phase feeding regime (*i.e.*, starter, grower and finisher diets fed at 2 weeks intervals) while the remainder used a four phase feeding regime, *i.e*., a pre-starter diet fed for first 7 days, starter diet (8-14 days), grower diet (15-35 days) and finisher (36-42 days).

Best practices on the farms

Fifty percent of the respondents mentioned that bird`s performance was monitored by making observations on feed intake, water intake, as well as, health on daily basis. Furthermore, 80% of the respondents said they did not keep birds with deformities but culled them, 16% kept them with the hope that they will reach slaughter age with others, whereas the remainder kept and only treated them when they exhibited signs and symptoms of the disease. These results indicated that animal welfare is lacking in some farms.

Handling and management care

Fifty-six percent of the respondents mentioned that they catch birds by their feet before loading them into crates, 24% held them by wings and feet

gently before placing them in crates while 20% caught them by their breast. In accordance with Terrestrial Animal Health Code - 28/06/2019, no birds were picked up by their neck and wings in this study. In this study, 70% of the respondents said they cleaned and disinfected poultry houses two weeks before the arrival of chicks, while 30% of the respondents cleaned and disinfected poultry houses one week before the arrival of chicks. Poultry houses should be disinfected and allowed to rest for 2 weeks to allow the chemical to dissolve within the house so that it does not become harmful to birds.

Three heat sources were used during brooding and these are *mbaula* (supplying artificial warmth to chicks by heating a container such as a drum using firewood or coal), electric heater and infra-red lamp. Brooding, which is a period from placement of one day old chicks to 14 days of age is the most critical time in the bird's life. Sixty-eight percent of the respondents used *mbaula* to provide heat to chicks, followed by 24% that used electric heaters while the remainder used infra-red lamps. *Mbaula* was widely used due to its low cost compared to other heat sources (Figure 2).

Figure 2. *Mbaula* as a heat source to broiler chicks

Other ways of ensuring welfare

In this study, all the poultry houses were open-sided. As illustrated in Figure 3, 30% of the respondents monitored temperature by opening and closing curtains in the poultry houses to facilitate ventilation as a way of ensuring birds' comfort. A foot bath which was provided at the entrance of chicken house was always recharged using appropriate chemical disinfectants such as Virocid, Virukill and Vet GL 20. Additionally, 25% of the respondents provided birds with adequate feed and water and used correct stocking densities.

According to Figure 3, 25% of the respondents provided their birds with feeds and water *ad libitum*, heat and light at night, 15% of the respondents educated their employees about welfare issues, whereas 5% of the respondents provided proper biosecurity measures, availability of clean water and adequate feeds to improve the welfare on farms. These findings point to the inadequacy of animal welfare on farms studied. Failure by farmers to apply sound biosecurity means indicates that mortality rate could be high in the surveyed farms.

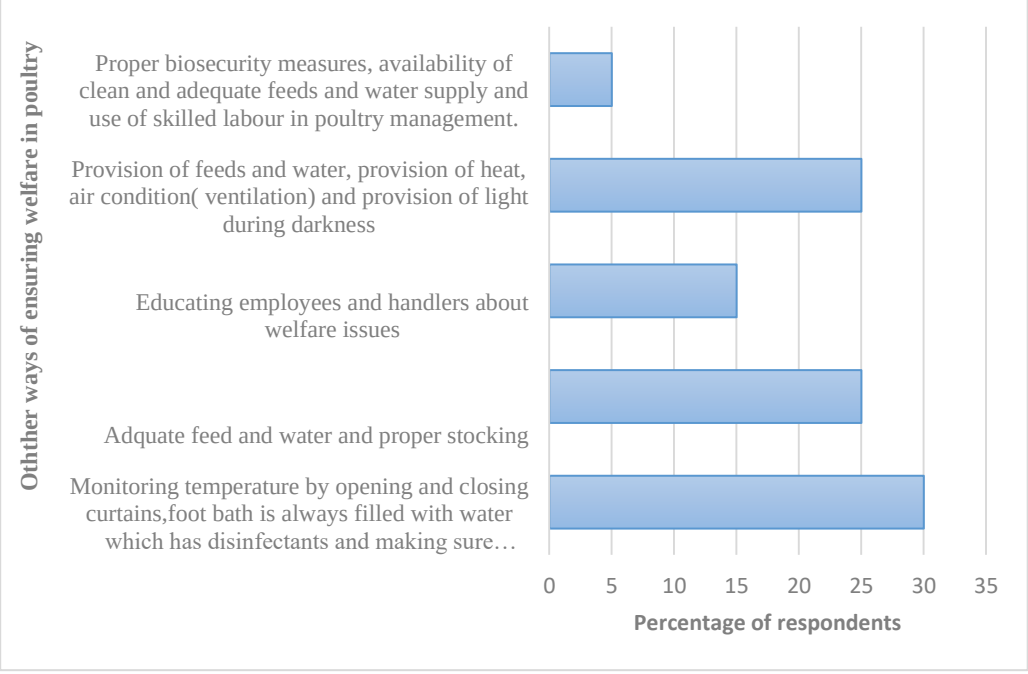

Figure 3. Other ways of ensuring welfare

Discussion

Ninety-six percent of the respondents strongly agreed that animal welfare is an important aspect in commercial poultry production while the remainder slightly agreed. The current finding is consistent with Rauch and Sharp (2005) who stated that it is important that animals are well cared for. Weeks and Nicol (2006) mentioned that it is important that animals are able to express behaviours that are priorities in a captive environment and that they should not suffer from unpleasant mental states such as pain, fear and distress.

Sixty-four percent of the respondents strongly agreed that welfare is important during transportation followed by 28% that moderately agreed and 8% was slightly disagreed. This implies that majority of the respondents have knowledge of animal welfare. According to Mitchell and Kettlewell (2009), poultry are exposed to a number of concurrent stressors during transportation with thermal challenges (both elevated thermal loads and cold stress) being the main threat to the welfare and survival of birds.

Animal welfare and broiler chicken production systems of the OIE - Terrestrial Animal Health Code - 28/06/2019 states that broilers should be housed at a stocking density that allows them to access feed and water and to move and adjust their posture normally. Fifty-six percent of the respondents strongly agreed that overcrowding affects welfare, followed by those that moderately and slightly agreed (Table 2). In agreement with this finding, Škrbić *et al.* (2009) observed that high stocking densities have negative effects not only on production performances and quality parameters, but also on indicators of broiler health and welfare. The finding indicated the need for government extension service to farmers to be aware of the deleterious effect of stocking density on poultry welfare. Duncan and Fraser (1997) argued that overcrowded birds cannot change their position to avoid heat, cold or dirt. According to Manser (1996) and Buyse *et al.* (2006), light is an important tool in the management practices for poultry production; photoperiod and light intensity are strictly controlled to promote growth and to avoid excessive feather pecking and cannibalism. Morris (1967) observed that continuous light regimes allow birds to feed continuously throughout the day. Earlier experiments have shown that growth rate and feed conversion are better under continuous light than under a natural day-night regime.

Eighty-eight percent of the respondents strongly agreed and 32% moderately agreed that pre-slaughter management practices affect performance of birds. This result is in line with Knowles and Broom (1990) who observed

that poor handling can result in pain for the birds resulting in their performance being affected.

Sixty-four percent of the respondents strongly agreed that the amount of feed given to birds affects their welfare. This finding is in line with Leeson and Summers (2000) who observed that the broiler parent stock have the same huge appetites as their progeny and have to be maintained on very severe feed restriction so that they are able to reproduce, and if allowed free access to feed, they soon become obese and suffer from all the problems of obesity, including low fertility and reduced life expectancy. Renema and Robinson (2000) also observed that feed restricted birds will show symptoms of hunger and extreme distress; hence reducing their welfare.

Only 50% of the respondents mentioned that they had some knowledge of welfare. OIE (2011) reported that many people in Botswana are oblivious of proper animal welfare; hence the need to educate children at school to create awareness. To raise awareness on animal welfare Abbas (2014) suggested that skills of smallholder farmers in developing countries should be improved by offering courses on proper poultry management. The author also posits that governments in developing countries in coordination with OIE should conduct semi-annual or annual workshops on poultry welfare concern to improve the awareness.

These results indicated that animal welfare is lacking in some farms. Duncan and Fraser (1997) observed that the state of welfare can vary from very good to very bad and that sometimes, one component of welfare is good while others are not, which is therefore important to be able to measure and monitor each component of welfare.

According to Duncan (1989), birds are often injured during catching and crating, frightened by novel stimuli, stressed by disruptions to their social and physical environment throughout the catching and when transported. In this study, 70% of the respondents said they cleaned and disinfected poultry houses two weeks before the arrival of chicks. Grow (1995) observed that correct application of disinfectants is an important step in the control and elimination of specific disease agents. Cobb-Vantress Inc. (2008) states that the survival of the newly hatched chick is largely dependent on how quickly and efficiently the transition is made from the hatcher to the farm environment. Moreki *et al.* (2020) in Botswana reported that stocking densities of 10-12 / m^2 enhanced broiler performance in open-sided houses compared to stocking density above 12 birds / m^2. According to Ross (1999), stocking density has a significant

influence on broiler performance; therefore extra feeder space and drinker availability must be reflected in any increases in stocking density.

The present study identified some welfare issues that affect birds such as transport, light, pre-slaughter management, handling, vaccination, as well as, stocking density. Based on the current results there is a need to educate commercial broiler farmers on the importance of poultry welfare and how it affects performance of birds. It is also important to make farmers aware of the five animal freedoms, *i.e.*, (1) freedom from hunger and thirst; (2) freedom from discomfort; (3) freedom from pain, injury and disease; (4) freedom to express normal behaviour and (5) freedom from fear and distress.

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