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(RESEARCH ARTICLE)

Causes and percentage of commercial poultry mortality in ElFashir Locality North Darfur State, Sudan

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Abstract

The study was conducted in ElFashir locality, North Darfur State, Sudan, to investigate the main causes of poultry mortality under the opened and semi-opened systems of current poultry farms conditions. The data were collected through a systematic questionnaire distributed to 21 farms representing all farms in the locality. A simple random sampling method was used to select farms. Respondents put land transport at 71.4% as the highest cause of death during the first week of life, and diseases (52.4%). Newcastle disease was identified as the most destructive disease in the study area. Malnutrition caused 47.6%, and lack of biosecurity and cannibalism (15.8%) as major causes of mortality in poultry older than a week. Poor management (51.9%) The density of birds over fodders and drinkers exceeds the recommended number (67.8%) of respondents. Graduates from colleges of animal production and veterinary medicine make up the percentage (73.7%), while graduates of other colleges make up 21% of those who perform the production process and supervision. The study concluded that birds in the study area died due to poor transport condition, diseases, malnutrition, mismanagement and lack of biosecurity measurements. Therefore, it is necessary for authorized sectors to induce intensive extension services and training of farmers and workers about the importance of adopting restrict biosecurity measurements in addition to good nutritional and health management of poultry flocks to sustain commercial production of poultry in ElFashir Locality.

Keywords: Chicken; Mortality; Mismanagement; Diseases; Malnutrition

1. Introduction

Mortality of birds in poultry production facilities represents a major economic loss for poultry producers and the integrators who usually own the birds. Not only do these dead birds represent lost income, they also represent a disposal problem that must be addressed in an environmentally friendly way. Disposal of dead birds becomes an even larger issue for producers each year as more attention is focused on the environment. Viral disease, protozoa, bacterial diseases were common diseases affecting broiler and layer chicken causing substantial losses due to mortalities. Additionally, ascites among broiler chicken and egg peritonitis among the layers caused high deaths (55). Poultry mortalities due to diseases are estimated to range from 20 to 50%, but it may rise as high as 80% during epidemics (62). Chick's mortality represents a major loss in poultry production system. Several reasons for the high mortality and low productivity have been suggested such as mismanagement, malnutrition, disease and predation (40) Newcastle disease (54) and predator attack. There is evidence that broiler chick from eggs weight less than 50 grams are not as profitable as chicks from larger eggs, records of mortality during the first seven days of brooding have been used to assess the quality of chicks in the broiler industry (14). In layer type production, mortality plays a major role in determining profit from egg production (22). Apart from genetic characteristics, disease, management and nutrition have been known to play a role in chick quality and to result in early chick mortality. Poor quality hatches have been reported to increased

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mortality from 0.8- 1.3% (68). In addition, (14) found the cumulative first week mortality in broiler chicks raised in rooms with open-curtain ventilation 1.30% compared with those raised in rooms with negative-pressure ventilation (1.42%) and water-cooled ventilation (1.37%). Breeder age affects the performance of a broiler flock differently throughout the grow-out period (46). Incubation condition, which is mostly related to breeder age (27), and egg storage length (63) also, affected the performance of the chicks at the broiler farm. (32) mentioned the importance of controlling the eggshell temperature during the incubation period because it affects the rectal temperature (body temperature) of the chick during the first week. The objective of the study is to assess mortality causes of commercial layers and broiler flocks in ElFashir locality.

2. Material and methods

2.1. Questionnaire Design

A survey was conducted on the commercial farms that raise broiler and layers in ElFashir locality from July to August 2017. The farms have a traditional, open and semi-open system. A questionnaire was designed to answer the questions asked. The survey included all local farms with response rate 100% for 21 poultry farms. Mortality measures included in the study were for example management causes, nutritional causes and infectious causes, personal biosecurity routines such as the use of protective clothing and boots and the use of hygiene barriers biosecurity measures as well as the farmers' thoughts and attitudes on mortality.

2.2. Selection of farms

A list of farms was obtained from the Ministry of Animal Resource in ElFashir records North Darfur State.

2.3. Data collection and analysis

Questions included in the survey were the source of day-old chicks, type of reception, levels of mortality, causes of mortality; the questionnaire was pretested on twenty-one poultry farms around ElFashir to obtain an indication of possible responses. Data were analyzed using data generated were exported to Statistical Package for Social Sciences (SPSS®) version 15 (59) and were analyzed using descriptive statistics to calculate the frequency of distribution of flocks, and percentage of mortality.

3. Results and discussion

The commercial layers and broiler flocks in ElFashir locality mortality rate causes land transport as the highest cause of death during the first week of life, and diseases. Newcastle disease was identified as the most destructive disease in the study area. Malnutrition caused, and lack of biosecurity and cannibalism as major causes of mortality in poultry older than a week, poor management. Table 1 showing the gender of the owner of the farm, Farms managed by men showed lowest mortality rate(MR) than by women, this may due to high skill and spare time of male than female, the gathered data indicated that the males number as graduates, vets or animal production professionals and expert among the farmer.

Table 1 The gender of the owner of the farm

Item	Frequency	Percentage
Male	15	71.4
Female	6	28.6
Total	21	100%

Moreover, males unlike females most of them are full time job (71.4) and non-households. Many developed countries show a long-term decline in the gender pay gap, but the trend is mixed in recent years (64).

Table 2 The social status

Item	Frequency	Percentage
Marriage	17	81
Single	4	19
Total	21	100%

Table 2 shows the social status. Marital status 81% married and unmarried 19%, Also, table 3 shows the educational status 9.5% of the respondents had secondary formal education, 52.4% had under graduate education, 38.1% graduate education. The field of farmers' work and professions Graduates of the faculties of animal production 42.9%, veterinary medicine 23.8% and other colleges, and business 26.3%. It was revealed that the training to respondents was done as a method of knowledge transfer to the chicken keeping society, which contributes greatly to the development and prosperity of this field with their expertise.

Table 3 The educational status

Item	Frequency	Percentage
Post graduate	8	38.1
Graduate	11	52.4
Secondary	2	9.5
Total	21	100%

Table 4 The occupation of owners

Subjects	Frequency	Percentage
Animal production	9	42.9
Veterinarians	5	23.8
Employees	4	28.5
Business	3	14.4
Total	21	100%

Most the pans were traditional opened76.2% and semi-opened system 23.8% housed their birds on deep litter and stated they prepared adequately to receive their chicks with feeding and lights.

Table 5 Change the letters with any new combinations of birds on mortality % of commercial poultry in ElFashir Locality

Subjects	Frequency	Percent
Renewed the letters with any new patch of birds	19	90.5
Stay the previous letters with any new of birds	2	9.5
Total	21	100%

Table 6 The housing system

Subjects	Frequency	Percent	Mortality %
Traditional open side system	19	90.4	76.2
Semi-close system	2	9.6	23.8
Total	21	100%	

Table 7 showing the source of the chick chicks from the hatcheries in Khartoum from the company Inma'a for poultry production and the Arab company for poultry production and the company ElShaheed, strain of Ross308 with 17.7% Hi-sex 29.4% and Lohmman 52.9%.

Table 7 The source of the chicks on mortality % of commercial poultry in ElFashir Locality

Subjects	Frequency	Percent	mortality %
Ashaheed hatcheries (Lehmann strain)	9	42.9	52.1
Coral(Hi-sex(strain)	5	23.8	29.1
Inma'a(Ross 308 strain)	3	14.3	17.2
Others strain(Hy-line ; Bovan and unknown)	4	19.5	1.6
Total	21	100%	

All the farms 100% vaccinated their flocks against Newcastle Disease (ND) + Infectious Bronchitis (IB) mixture and Infectious Bursa Disease (IBD) for the commercial broiler and layer beside vaccinated the layer with Fowl Pox; some farms supplemented their flock's chickens with vitamin in water 47.6% after vaccination and 52.4% before and after vaccination.

Table 8 The dose is given

Subjects	Frequency	Percent
Administrate the vaccine in water	17	81.0
Administrate the vaccine in nostril / eyes	2	9.5
Administrate the vaccine aerosol	2	9.5
Total	21	100%

The number on labors depend on the numbers of barns and their capacity of birds, the farm with one labor 47.3%, two labors 35.3% with three labors 11.8% and with four labors 5.9%.

Table 9 The effect of age on mortality % of commercial poultry in ElFashir Locality

Subjects	Frequency	Percent
Mortality at first three weeks	15	71.4
Mortality at 4-5 weeks	2	9.5
Mortality at 20 -24 weeks	2	9.5
Mortality at 65-75 weeks	2	9.5
Total	21	100%

Table 9 showing the effect of age on mortality % Early chicken mortality was associated with their reception from Khartoum where 15 farms showed (71.4%) of mortality at first week(11farm layer and 4 farms broiler), each two of the remainder six experimental farms revealed mortality rate 79.5% but at different age period interval 4-5, 20-24 and 65-75 week respectively. Another important parameter in the analysis of mortality in avian flocks is the age at the point of death. The finding of these study was agree with (69) showed that broiler mortality usually peaks at approximately 3 to 4 day after placement, declines until approximately day 9 or 10 and then stabilizes until approximately day 30. After day 30, a gradual increase is seen until approximately day 40 to 45. After day 45, mortality rates increase until the harvest. The various management causes can include the following:

3.1. Brooding

Brooding temperatures numbers of farmer's respondent, the percentage of mortality at first week 71.4% caused at initial period of rearing chicks. The chicks brooded at 20°C had lower feed and water intake during a 7day post-hatching period compared with birds kept at 25 and 35°C, respectively (36). Environmental temperature is an important factor for broiler performance, and chicks brooded at 35°Cshowed a significantly lower body weight. (65) Observed that high

thermal exposure of chicks during the 1st day post-hatching resulted in body weight losses. Exposure to high temperatures during the first 2 days of life causes body weight losses of about 12% in chicks (66).High brooding temperature causes reasons for spiked mortality in layer chickens may not always be associated with disease. Hot-dry climatic environment is associated with heat stress, waning immunity and inefficient feed usage and increase probability of death with reduced egg production. (18) Revealed that high chick mortality was recorded with severe clinical signs and septicemic picture of most inoculated chicks in different subgroups. Chilling leading to secondary infections with bacteria or respiratory viruses (52) therefore, high environmental temperature also affects metabolic levels in chickens. (33) Found that feed conversion increases with decreasing air temperature. Mortality has also been shown to increase with decreasing air temperature (16 and 10). Although temperature may vary depending on management, it was suggested that temperature should be set at 31 ˚C at chick placemen to and then decrease to 17 to 21˚C at three weeks of age (13). Mortality has also been shown to increase with decreasing air temperature (49; 16 and 10). Transport the farmer poultry production was delivered 95.2% of birds by vehicle tracks from Khartoum 4.8% by airplane cargo. Elevated mortalities associated with long-journey and vehicles transport of day-old commercial chicks are expected to increase, if conditions within the transport lorry from the hatchery are not carefully controlled. Moreover early losses due to chilling, smothering in boxes or dehydration will worsen the impact of distance on transport-related mortality for individual poultry species and categories. Although the actual flight time was less than 20 h, the total journey duration was found to range from 41 - 72 h. The results showed a proportional relationship between journey duration and chick mortalities. Vaccination programme the respondent's administrated of vitamins after vaccination 47.6%, and before vaccination 48%. All farms use vaccines to combat pervasive diseases to vaccinate birds. Three farms 14.3% were infected of Newcastle disease (ND) and one farm 4.8%, infected with infectious bursa disease (IBD), may attribute to vaccine damage, incompetence, mismanagement and storage during and after use. The widespread distribution of (ND) and the (IBD).The percentage of mortality in farms infected with the (ND) mortality exceeded 50% of the total birds, and the farms infected with (IBD) mortality 80%.That have occurred over the last ten years provide examples of the negative impact of such diseases on the poultry producing sector and on society as a whole (31 and 20). The efficacy of vaccine administration and the level of immunological response in vaccinated birds can be serologically monitored (58 and 15). Dehydration the bodies of young chicks contain 70% water. Continuous high temperatures cause loss of water from the body. When fluid loss reaches 10%, mortality will follow. There is confirmation that hydration accompanied by a readily available energy substrate favor metabolism that results in broiler growth. Moreover mortality to be as high as 6% when chicks were hatched from 29-week-old breeder eggs weighing 47-54 g. Body weight loss appears to be the consequence of dehydration and yolk utilization (12).Starve-outs small chicks which die during the first 3-5 days of life and are shown not to have eaten any food material and which do not have any signs of infection can be considered to be starve-outs, we would normally expect a maximum of 1% of these in a flock during the first seven days of life. Levels above this 4.8 -14.3% may be caused by a number of factors as discussed in infectious disease. (43) Hyper peristalsis and dysperistalsis produced by hunger sensation. Bedding materials litter90.4% of respondent farms were using shaving woods; Straw is commonly used 4.8% and 4.8% using sand, bedding materials litter can play a vital role in maintaining a good temperature within all parts of the house. Litter source material usually varies according to regions (35 and 57); sawdust, rice or oat hulls, sugarcane pulp or bagasse, chopped straw, paper mill by-products, sand, wood shavings, corn cobs, and dried leaves are often used as litter source (60). Litter is composed of the bedding material plus the excreta, feed, feathers, and water. Its moisture and quality have been associated with health and performance as well as with broiler welfare, as it should reduce the floor humidity while giving the sense of comfort and allowing natural scratching behavior (28 and 57) it also helps the thermal insulation, moisture absorption, and reduction of ammonia emissions and serves as a protective barrier from the ground (9).

3.2. Stocking density

Stocking density 10-20 birds per feeder 38.1% farms, while 19.9% 0f respondent used the space of 21-25 birds/feeder, and 26 -30 birds/feeder with percentage of 42.9%. The placement density can be partially explained by less feed consumption as evidenced by 95.4% of the sums of squares of BW gain being attributable to feed consumption. Litter moisture content and foot pad lesion score increased linearly with increasing placement density. Upon processing, whole carcass and breast meat yields relative to BW were not affected ($P \geq 0.05$) as density increased from 30 to 45 kg/m^2, these indicate that increasing the density beyond30 kg/m^2 elicited some negative effects on live performance of heavy broilers (17). Have suggested that strain of birds and stocking density impact on egg production, egg weight, egg output and mortality, and recommended a standard of 733 cm^{2}per hen under the tropical environment(8). Estimated that reducing flock size and stocking density can minimize disease risk (4 and 25). Showing that while overcrowding can lead to higher mortality rates (7). In poultry production a large number of factors, such as stocking density, environmental deterioration, unsuitable social environments, thermal stress, or difficulties in accessing essential resources can be major sources of stress that can lead to welfare deterioration and reduced performance (37 and 61).

Table 10 The number of birds per the fodder and drinker

Subjects	Frequency	Percent
Number of birds between 10-20 per fodder	8	38.1
Number of birds between 21-25 per fodder	4	19.5
Number of birds between 26-more per fodder	9	42.9
Total	21	100%

3.3. Biosecurity

Table 11 Effect of biosecurity measurement on mortality % of commercial poultry in ElFashir Locality

Subjects	Frequency	Percent
Using soap and disinfectants to clean drinking equipment's	15	71.4
Using water only to clean drinking equipment's	6	19.0
Total	21	100%
Using new litter with each new poultry patch inside the farm	19	90.5
Leave the old bedding litter stay inside the farm with the new flock patch	2	9.5
Total	21	100%
Provide disinfectants in front of barns entrance	11	52.4
Never Provide disinfectants in front of barns entrance	8	38.1
Sometimes Provide disinfectants in front of barns entrance	2	9.5
Total	21	100%
There is only one type of bird in the farm	13	61.9
There are mixed species of birds and animals in the farm	8	38.1
Total	21	100%

The respondents 38.1% hasn't any hygienic at gate bath and have existence of animals shed on the poultry farm, the absence of disinfectants control strategies and inadequate management practices result at the entrances gates contributes to transport of the pathogenic agents to the birds as a result of mechanical transport or through direct contact, which bypass and enter barns, therefore the threat of spread of virial or bacterial and other avian diseases between farms due to close proximity will be reduced and the practice of poor biosecurity by a farm is less likely to endanger the investment of a neighboring farm. This in line to studies that some poultry farms have in their availability of rations and water a converging point for wild birds, and other migratory birds which have been identified as reservoirs of virus which may also increases the risks of disease introduction and maintenance (44 and 67). The unrestricted access of unapproved persons and animals in some commercial poultry farms in as reported study highlights risk posed by failure of biosecurity measures in isolation and traffic control with respect to disease (1). only about 12% use a combination of hand washing and footbath, the use of detergents in washing farm equipment contributes to reducing equipment contamination and terminate microbes to reduce disease transmission, hygienic interventions have resulted in reduced incidence, particularly in less-developed countries (2).The study also revealed that most farms have no gates, entrance or fence thereby allowing unrestricted access to the farms by unauthorized visitors, animals, equipment or carriers of disease in to the farm. This practice would allow disease transmission as humans can serve as mechanical transmitters (11 and 5). 81% the presence of rodents, pets, access to barns, good biosecurity program identifies and controls the most likely ways a disease could enter the farm. Similarly, the practice of poultry attendants keeping pets, animals and none utilization of protective these attendants may also increase the risk of disease from local poultry to the commercial poultry.

Table 12 The presence of wild birds, rodents and pets on mortality % of commercial poultry in ElFashir Locality

Subjects	Frequency	Percent
Rodent, Pets, wildlife birds have access to barns	17	81.0
The barns are closed in a way that does not allow birds to enter and locked doorways	4	19.0
Total	21	100%

The risk of pets in introducing disease to commercial poultry is further supported by previous study indicating that pets and animals maintains the disease in circulation and act as reservoirs and carriers (6 and 30). 90.5% of the farms use new bedding litter with each new flock within the farm and 9.5% reused the old bedding litter for the new flock. Used litter can become pathogens that affect bird performance. High humidity, warm temperatures and high pH favor the proliferation of pathogens in the litter. More serious viral and bacterial diseases known to spread easily in contaminated litter, in addition, fungi that produce mycoses or mycotoxicoses have been isolated in broiler litter, and there is some evidence that these may cause increased mortality when flocks are reared on reused litter. Parasites are also a potential problem in reused litter. On-farm biosecurity during poultry farming is an integral part of farming practice targeting the management of pathogens. Thus, studies have looked at possible biosecurity-based interventions and strategies to reduce on-farm Campylobacter (42).

3.4. Nutritional causes

Table 13 showing the diagnosis causes on mortality % of commercial poultry, the respondent's farms of 42.9% returned mortality of their poultry to malnutrition. The poor storage of raw materials, the increase of limestone above the recommended limits, the lack of experience of some breeders in the composition of the rations and the fact that many farms are mixing feed materials manually, which reduces the homogeneity of the ration. The nutritional recommendations result in excellent production in a wide variety of situations and are derived from observations in the field with mash and pullets layer hens. However, specific conditions and specific production objectives may necessitate increasing or decreasing the recommended daily energy and nutrient intakes. In such cases, advice from or a professional nutritionist is recommended. A fairy large number of different elements and compounds are required for the normal nutrition of poultry. If one or more of them are not present in the diet in adequate quantity, or if certain ones are present in an unsuitable ratio, there is a disturbance of nutrition, or of the functioning of the body, which may be referred to as a malnutrition disease. Other Nutritional diseases may result from harmful elements or compounds in the diet. The first route of lipid peroxide loading of the organism is via the feed, such as through oxidized lipids (34). The second problem is the insufficient amount of antioxidants in the feed, e.g. vitamin E deficiency. The third source of free radical generation is the toxic level of different feed ingredients, e.g. toxicoses caused by vitamin A, selenium, and ionophore antibiotics. (21) Showed that the decrease in protein levels from 7 to 21 days of age contributed to lower nitrogen excretion in broiler chickens, but impaired performance and carcass characteristics independent of rearing temperature.

Table 13 Diagnosis causes on mortality % of commercial poultry in ElFashir Locality

Subjects	Frequency	Percent
Pathogenic	12	57.1
Nutrient deficiency	9	42.9
Total	21	100%

3.5. Infectious causes

Table 14 shows more than half of the farms account for mortality, sudden death syndrome account 19% while normal mortality accounts 42.5%, despite the fact that respiratory mortality is 9.5%, the same in cases of diarrhea that mortality causes in birds 9.5%. Sudden death syndrome (SDS) is a leading contributor to mortality in broiler chicken production. Although the precipitating event has yet to be ascertained," Cardiovascular failure" appears to be the immediate cause of death. Pathogenesis stress (PS) is the main factor to contribute towards the pathogenesis of sudden death syndrome.

Table 14 Death symptoms of commercial poultry in ElFashir Locality

Items	Frequency	Percent
Sudden death	4	19.0
Normal mortality in flocks	9	42.5
Respiratory symptoms	2	9.5
Diarrhea	2	9.5
Others	4	19.5
Total	21	100%

Table 15 The flock mortality causes on mortality % of commercial poultry in ElFashir Locality

Subjects	Frequency	Percent
Death occurs in normal birds	18	85.7
The occurrence of bird deaths in the unusual	3	14.3
Total	21	100%

Table 16 Mortality rate on commercial poultry in ElFashir Locality

Subjects	Frequency	Percent
Normal mortality	3	14.3
More than 50%	13	61.9
Between 30-46%	2	9.5
Between 20-25%	3	14.3
Total	21	100%

Thus, tables 14 - 16 shows that the respondent's farms of 57.1% returned mortality of their poultry to Pathogenic infectious causes**;** this is one of the commonest causes of high levels of mortality in chicks of all types. Generally, the chicks start well; however, levels of mortality start to raise from 24 hours of age onwards, this peak at 3-4 days of age and then start to fall back to normal levels by 5-7 days of age. cannibalistic pecking may also cause mortality, either directly or indirectly due to infection of the wounds (70 and 23).Peak mortality usually occurs between 3 and 4weeks of age (24 and 45), hypothesized of that cannibalism, excitement, fighting and pilling induced by light intensity above optimum would place broilers under stress and implied that these could lead to death from sudden death syndrome, whereas(50) observed that chickens were no more likely to die from SDS in area of relatively high light intensity than in darker areas(41).In broilers pelleted feed is extensively used. It has many advantages. It reduces bulkiness, minimizes, wastage, destroys toxin while pelleting and processing and it has higher digestibility as compared to mass. Due to pellet feed there is faster growth rate hence incidence of SDS and ascites are more in broilers (29). Broilers chickens are generally reared at a considerably higher stocking density. Such rearing conditions may act on the birds as a stress that causes functional disorders in their organs including the heart(29).Stress:(Lighting and stocking density) Catecholamine (Adrenal gland) Increased Ca^{++} in cardiac muscles Cardiac arrhythmiac) Exercise Systolic, diastolic and mean blood pressures significantly decrease during exercise. Exercise and stress release catecholamines into circulation when combined with hypotension, severe congestion of abdominal organs would results in to SDS. In SDS, birds heart tissue reveals lower amount of linoleic acid and arachidonic acid hence decrease in the synthesis of prostaglandin which leads to deterioration of membrane structure and cardiovascular disturbances causing cardiac arrhythmia, heart function failure and increase the incidence of SDS (29)

Table 17 Effect of pathological cause's mortality % of commercial poultry in ElFashir Locality

Subjects	Frequency	Percent
Pathological causes	12	52.4
Non pathological causes	9	42.9

The top 17 causes of normal mortality, in rank order of prevalence, were determined to be the following: egg yolk peritonitis, hypocalcemia, gout, self-induced molt, salpingitis, caught by spur, intussusception or volvulus (twisted intestine), cannibalism (pick out), tracheal plug, septicemia, fatty liver syndrome, internal layer, layer hepatitis, persecution, and prolapsed vent. There are many common and important diseases which can affect the respiratory system (air passages, lungs, air sacs) of poultry. People keep the birds for their use and generally include the chicken. In the wet form there are canker-like lesions in the mouth, pharynx, larynx, and trachea. The wet form may cause respiratory distress by obstructing the upper air passages. Chickens maybe affected with either or both forms of fowl pox at one time. The highly contagious and lethal form of Newcastle disease is known as viscerotropic (attacks the internal organs) velogenic Newcastle disease. Infectious bronchitisis a disease of chicken's only.

A variety of enteric bacterial diseases are recognized in poultry. Three of these bacterial diseases, necrotic enteritis, ulcerative enteritis, and spirochetosis, primarily infect the intestine, whereas other bacterial diseases, such as salmonellosis, colibacillosis, mycobacteriosis, erysipelas ,and fowl cholera, affect a variety of organ systems in addition to the intestine. Diagnosis of bacterial enteritis requires monitoring of clinical signs in the flock and proper use of diagnostic methods such as necropsy, histopathology, bacteriology, and serology (51). Necrotic enteritis of poultry is caused by toxigenic Clostridium perfringens has been shown to produce the enteric lesions of necrotic enteritis when administered to broiler chicks (3). The major disease syndromes in colibacillosis of poultry are yolk sac infection, respiratory disease complex (airsacculitis, perihepatitis, pericarditis), acute septicemia, salpingitis, peritonitis, synovitis, osteomyelitis, cellulitis, and enteric coligranuloma. Young birds with little resistance to infection will acutely die from septicemia, but older chickens are often resistant and survive the initial septicemic lesions (39). Fowl cholera is a severe systemic bacterial infection that affects chickens. Death is usually caused by bacteremia and endotoxemia, especially in acute cases. Birds may die without clinical signs, but may be depressed with cyanosis and diarrhea.

Avian mycobacteriosis (avian tuberculosis), a chronic disease that affects a wide range of birds The tubercles can be scattered along the serosa of the entire intestinal tract, often penetrating the full thickness of the intestinal wall (38). Pullorum disease is most lethal in young birds 3 week old or less with minimal effects on adults, while the mortality observed in FT affects young birds and persists out to adulthood (47).The farmer should be sure of the hatchery and the breed to raise/rear for production. The high mortality rate might be due to the poor health care practices followed by the farmers and keeping the birds beyond standard rearing period of the broilers. Many studies reported that the mortality was below 10.00 per cent (26; 56 and 19). It is observed that birds were suffering from diseases like diarrhoea, paralysis, dysentery etc. in most of the farms. The majority of deaths were attributed to Ascitis Syndrome, Chronic Respiratory Diseases (CRD), Enteritis and Coccidiosis were the main cause of mortality in broilers (53 and 48).

4. Conclusion

The study concluded that the causes of mortality in birds are due to several reasons, including deportation, where the chicks are shipped and transported over long distances, and the farms are close to each other and sometimes close together, in addition to administrative negligence and non-compliance with biosecurity procedures.

Compliance with ethical standards

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Disclosure of conflict of interest

There are no conflicts of interest in connection with this paper.

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