Bhutan Journal of Animal Science (BJAS)
Volume 5, Issue 1, Page 108-112, 2021

ANALYSIS OF PIGS MORTALITY AT NATIONAL NUCLEUS PIG BREEDING CENTRE, YUSIPANG

NK THAPA[1], PUSPA MAYA SHARMA[1], MENUKA RAI[2] AND RB GURUNG[1]

[1]National Centre for Animal Health, Serbithang, Thimphu
[2] National Nucleus Pig Breeding Centre, Yusipang, Thimphu, Bhutan

Author for correspondence: nkthapa08@hotmail.com

ABSTRACT: A retrospective study was conducted to understand the extent and causes of mortality in pigs at the National Nucleus Pig Breeding Centre, Yusipang. This study used secondary data on pig deaths, observed clinical signs recorded and molecular laboratory reports to assess the extent and causes of mortality. The data were analysed descriptively using Microsoft excel. The farm average mortality rate was recorded at 6.78 in 2018-19. Highest mortality rate was recorded in adult pigs (13.3%), followed by sucklers (5.9%), weaners (5%) and growers (2.9%). Seasonally, the highest mortality was recorded between October to January and December to February in the sucklers and weaners, respectively. Majority of the mortality in sucklers (97.6%) and weaners (67.7%) are recorded as sudden death. Similarly, a large number of growers (31%) are also recorded to have died suddenly, followed by lameness (24.1%), Blue ear (20.7%). In the adult group, highest case reported was associated with Chronic illness and weakness (27.3%) followed by digestive related illness (21.2%), high respiration (15.2%) and reproductive problems (12.1%). As per the necropsy findings, cause of highest death was due to hepatic disorder (28.9%) followed by cardiopathy (15.6%), and respiratory infection and septicaemia (12.5%). The main isolates in the bacterial infection and septicaemia were *Escherichia coli*, *Erysipelothrix rhusiopathiae*, *Klebsiella*, *Streptococcus* and *Staphylococcus*. *Salmonella* was isolated from diarrhoeal cases in piglets in the month of May 2019. Similarly, *Staphylococcus hyicus*, *Streptococcus*, *Corynebacterium*, *Actinomyces*, *Actinobacillus* and *Escherichia coli* were also isolated from animals with reproductive disorder. Molecular analysis confirmed negative against ASF, CSF, PRRS and Brucellosis. The three main steps in biosecurity measures - segregation, cleaning and disinfection needs to be strictly instituted. NNPBC should have adequate space for isolation of the sick animals, proper water supply for cleaning and adequate stock of disinfectants for routine disinfection. Additionally, proper health monitoring of the animals also needs attention.

Keywords: Hepatic; pig; molecular analysis; mortality; Suckler; weaner.

1. INTRODUCTION

Mortality in any age group of pigs impacts the economy of the farm. In the government input supply farms, it makes it difficult to meet the piglet demands of farmers. A high rate of culling and mortality, especially of sows, cause production losses and indicates underlying welfare issue in the farm (Ala-Kurikka et al. 2019). Confinement system of large group of pigs in a single building or shed creates ideal environment for transmission of infectious disease causing agents (Maes et al. 2001). Many pathogens are transmitted through direct contact between infected pigs and susceptible pigs (FAO 2010). The higher shed stocking density is also associated with increased mortality (Mehling et al. 2019).

The government breeder farm at Yusipang was established in 2016 for maintaining the Great Grand Parents (GGP), Grand Parents (GP) and Parent Stock (PS) of white pig breeds. The new stock of Landrace and Yorkshire were imported from Thailand. The farm has the objective to supply genetically improved piglets to the farmers to enhance domestic pork production. These pigs successfully completed 15 days of quarantine at Paro International Airport. However, in the subsequent years, the farm observed various degrees of mortalities in different categories of the animals. The PS, particularly reported considerable rate of mortality in the farm. Hence, a retrospective study was conducted to understand the extent of mortality in different category of pigs and identify the cause(s) of mortality.

2. MATERIALS AND METHODS

Mortality was investigated retrospectively in all categories of animals at the National Nucleus Pig Breeding Centre, Yusipang (NNPBC) from July 2018 to June 2019. In 2019, farm had a stock strength of 690 sucklers, 619 weaners, 997 growers and 241 adults. The data on dead animals from July 2018 to June 2019 was collected from the register maintained at NNPBC. Additional data were obtained from the records of post-mortem conducted at the National Centre for Animal Health (NCAH). The causes of pig mortality were compiled from the post-mortem report and other laboratory findings maintained at NCAH. In addition, lab results for the clinical cases like diarrhoea and reproductive failures were also compiled.

Simple descriptive analysis was done using Microsoft excel. The mortality rate was calculated by dividing the number of pigs that died during the year, by the total number of pigs in each category available during the year. Clinical cases observed during the year was also calculated by dividing the number of animals affected by the total number of animals in particular category.

3.3 RESULTS AND DISCUSSIONS

3.1 The extent of pig mortality in NNPBC

As per the farm record, the overall mortality rate of pigs at NNPBC during the year was 6.78% (SE± 2.26) (Table 1). The mortality rate, however, differed between different category of pigs. The highest mortality was observed in the adult pigs (13.3. %), followed by suckler (5.9%) and weaner (5.0%). The grower pigs had the lowest mortality rate at 2.9%. Maes et al (2001), however, observed highest mortality rate in grower- finisher pigs in similar multisite production. Cameroon (2000) argues such higher adult pig mortality could be due to the endemicity of the diseases that gets established in the older group of animals. The mortality rate of 13.3% is comparable to the 12% mortality rate found in grower finisher pigs in the US (Losinger et al. 1999).

The overall mortality in the suckler and weaner was about 5-5.9% at NNPBC and this finding is in concurrence with USDA (2015) which reported 5.9% in weaner -finisher category in commercial farms. However, on the contrary to the mortality in the pure line exotic pig breed piglet, mortality was reported as high as 20.13% under field condition in Bhutan (Nidup et al. 2011). This could be due to the difference in level of management between government farms and actual field condition. The management of pigs in the field are inferior compared to government farms. Previous studies have recommended improving care and management of piglets in the field to reduce preweaning and postweaning mortalities (Thapa 2011; Sherab 2012; Om et al 2018).

3.2 Seasonal pattern in pig mortality

The highest mortality in sucklers was recorded during October to January. However, considerable mortality was also recorded during July. In weaners, mortality was recorded higher during December to February.

Table 1: Mortality rates in various categories of pigs

Category	Opening balance	New addition/born	Total stock	Nos. dead	Mortality rate (%)
Suckler	27	663	690	41	5.9
Weaner	164	455	619	31	5.0
Grower	634	363	997	29	2.9
Adult	106	135	241	32	13.3
Total	931	1616	2547	143	6.78

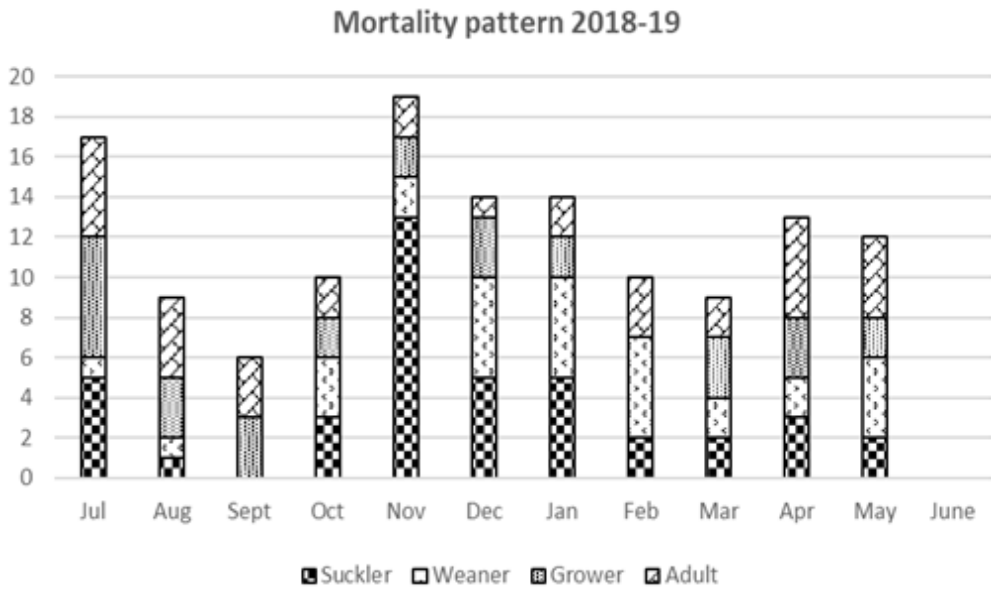

Figure 1. Seasonal pattern of mortality 2018-19

The high mortality in suckler and weaners during winter is comparable to observation made by Maes et al. (2001) and could be attributed to cold stress. In growers, the mortality was almost uniform throughout the season. In contrast adult pigs had considerable mortality from April to August (Figure 1).

3.3 Clinical signs observed in the pigs

The signs observed in the affected animals are summarized and presented here. As per the records maintained in the farm, majority of young pigs have died suddenly. The percentage of young pigs that died suddenly are 97.6%, 74.2% and 31% for sucklers, weaners and growers, respectively. Other conditions such as weakness, diarrhoea, fever was recorded at 16.1% (Table 2 & Table 3). Similar, incidences of high mortality in pigs were reported by Ala-Kurikka et al. (2019), wherein some 48% of death in pigs were observed without any signs per farm records. The reasons for sudden deaths could be due to failure to observe clinical signs and some acute infections. Next, lameness was recorded as high as 24.1% in the growers. Lameness was the highest clinical signs recorded in the sows with 9% (Ala-Kurikka et al. 2019). At NNPBC, the common cause of lameness was due to infection or suppuration of joints. Lameness is broad categorization and it may not necessarily be the cause of mortality in pigs.

Table 2: Clinical signs of the affected sucklers and weaners in percentage

Clinical conditions	Sucklers (n=42)	Weaners (n=31)
Sudden death	97.6%	74.2
Weakness	-	9.7%
Others (diarrhoea, fever, epistaxis)	2.4%)	16.1%
Total	100	100

Table 3: Clinical signs of the affected grower (n =29)

Conditions	Percentage
Sudden death	31.0
Lameness	24.1
Blue ear	20.7
Others	10.3
Weakness	6.9
Vomiting/off feed	6.9
Total	100

The farm records also revealed various clinical signs exhibited by the adult animals. For the purpose of analysis, these were grouped into various conditions. The highest case reported was associated with chronic illness and weakness (27.3%), followed by digestive related illness (21.2%), high respiration (15.2%), and reproductive problems (12.1%). Digestive illnesses include off-feed, poisoning and vomiting, whereas reproductive problems include vaginal discharge, mastitis, metritis and dystocia (Table 4).

Table 4: Clinical signs in the affected adults (n=33)

Clinical conditions	Percentage
Chronic illness/weakness	27.3
High respiration	15.2
vomiting/off feed/poisoning	21.2
Lameness/paralysis	6.1
Sudden death	9.1
Reproductive disorder	12.1
Others	9.1
Total	100

3.4 Necropsy records of pig mortality

The necropsy records were compiled and grouped into various categories as below.

As per the necropsy findings, highest cause of death was due to hepatic disorder (28.9%) followed by cardiopathy (15.6%), respiratory infection and septicaemia (12.5% each) (Table 5).

The main isolates in the bacterial infection and septicaemia were *Escherichia coli, Erysipelothrix rhusiopathiae, Klebsiella, Streptococcus* and *Staphylococcus. Streptococcus* have been found to be the most important agent causing septicaemia in piglets and postweaning animals whereas *Staphylococcus* have been found as an opportunist agent (Staats et al 1997).

Salmonella was isolated from diarrhoeal cases in the piglet during the month of May 2019 indicating outbreak of porcine Salmonellosis. Most outbreaks of the porcine Salmonellosis were observed in intensively reared weaned pigs in other countries too (Wilcock, 1986). From the samples collected from animals with reproductive disorders, bacteria isolated included *Staphylococcus hyicus, Streptococcus, Corynebac terium, Actinomyces, Actinobacillus* and *Escherichia coli.* These are the potential organisms causing abortion and reproductive failure in sows (Holler 1994) and have been isolated from various forms of reproductive failures including abortion and still birth in the sows (Salogni 2016). Viral causes like Porcine Respiratory Reproductive Syndrome (PRRS) were ruled. Porcine Circovirus Type2 could not be established due to lack of testing kits.

Table 5: Various causes of death as per the necropsy diagnosis (n=128)

Conditions	**Percentage**
Anaemia	9.4
Ascites	0.8
Bacterial infection	3.1
Cardiopathy	15.6
Gastro enteritis	7.8
Hepatic disorder	28.9
Respiratory infection	12.5
Renal disorder	4.7
Septicaemia	12.5
Shock	0.8
Stress	3.1
Toxaemia	0.8
Total	100

4. CONCLUSION

The mortality rates of pigs though high are not alarming in all the animal categories and are comparable to findings from studies elsewhere. However, most of the pig deaths are management related. High prevalence of various pathogenic bacteria in most pigs, especially the ones presenting reproductive disorders were observed. It is possible the propagative infection persisted undetected for some time due to lack of isolation facilities at NNPBC. The highest suckler and weaners' mortality in winter warrants attention to heat insulation of their sheds. Proper care needs to be provided with highest standards for hygiene, sanitation and strong biosecurity measures to bring down the infection and be able to observe signs before sudden deaths. Important diseases like AFS, CSF, PRRS and Brucellosis were however, not observed with molecular diagnosis. The future investigation needs to be expanded to other diseases like Porcine Circovirus-2 (PCV-2) and *Mycoplasma hyopneumonae* infections. There is history of outbreak of PCV-2 in earlier stock of pigs at the farm. These two diseases are of significant importance in pig husbandry. Simple biosecurity measures such as regular use of disinfectants in the foot dips and the floors need to be strengthened. The hygiene and management of the farm needs to be improved. In addition, routine health monitoring of the animals by inspection and proper timely treatment of animals needs to be carried out by the farm.

Acknowledgements

The authors are thankful to Choedup Gyelsthen of NNPBC, Tshewang Dema and Tenzinla of NCAH for their contribution in data collection and lab analysis.

REFERENCES

Ala-Kurikka E, Munsterhjelm1 C, Bergman P, Laine T, Pekkarinen H, Peltoniemi O, Valros A and Heinonen M. (2019). Pathological findings in spontaneously dead and euthanized sows – a descriptive study. Porcine Health Management, 5:25. https://doi.org/10.1186/s40813-019-0132-y

Cameroon RDA. (2000). A review of the industrialisation of pig production worldwide with particular reference to the Asian region. pp 17-29.

FAO (2010). Good Practices for Bio-Security and Health. Animal Production & Health. Pp: 7-10.

Maes D, Larriestra A, Deen J and Morrison R. (2001). Retrospective study of mortality on grow-finish pigs in a multi-site production system. Journal of swine health and production 9(6): 267-273.

Holler DL. (1994). Diagnosis of swine abortion. Swine Health and Production 2(6). Pp29:31.

Losinger WC, Bush EJ, Smith MA and Corso BA. (1999). Arquivo Brasileiro de Medicina Veterinária e Zootecnia, 51(2) Belo Horizonte**.** https://doi.org/10.1590/S0102-09351999000200003

Mehling S, Henao-Diaz A, Maurer J, Kluber E, Stika R, Rademacher C, Zimmerman J, Giménez-Lirola L, Wang C, Holtkamp DJ, Main R, Karriker L, Linhares DCL, Breuer M, Goodell C and Baum D. (2019). Mortality Patterns in a Commercial Wean-To Finish Swine Production System. Veterinary Science, 6:49; doi:10.3390/vetsci6020049.

Nidup K, Tshering D, Wangdi S, Gyeltshen C, Phuntsho T and Moran C. (2011). Farming and biodiversity of pigs in Bhutan. Animal Genetic Resources, 48:47–61.

Om S, Sherub P, Gyeltshen T and Timsina MP. (2018) Mortality of piglets in government pig farm. Bhutan Journal of Animal Science (BJAS), 2(1): 42-48.

Salogni C, Lazzaro M, Giacomini E, Giovannini S, Zanoni M, Giuliani M, Ruggeri J, Pozzi P, Pasquali P, Boniotti MB, and Alborali GL. (2016). Infectious agents identified in aborted swine fetuses in a high-density breeding area: a three-year study. Journal of Veterinary Diagnostic Investigation, 28(5):550– 554.

Sherab P (2012). Effects of feeding red soil to piglets for prevention of piglets anemia in the confined pig rearing system. BSc. Thesis. College of Natural Resources, Lobesa, Punakha.

Staats JJ, Feder I, Okwumabua and Chengapa MM. (1997). Streptococcus suis: past and present. Veterinary Research Communication, 21:381–407.

Thapa L. (2011). Assessment of performance of the Government farms in Bhutan. College of Natural Resources, Lobesa, Punakha.

USDA. (2015). Swine 2012: Part I: Baseline reference of swine health and management in the United States, 2012. Fort Collins, CO: USDA-APHIS-VS, CEAH. #663.0814.

Wilcock BP. (1986). Salmonellosis. In: Leman AD, Straw RD, Glock WL et al. (Eds). Diseases of swine. 6.ed. Ames: Iowa State University.