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A Survey of Neonatal Piglet Mortality in Commercial Pig Farms in Lagos State, Southwest Nigeria

Eleazar, A.N.[1]*; Sonibare, A.O.[1]; Ojo,O. E.[2]; Awoyomi, O. J.[3]; Otesile, E.B.[1]

[1]Department of Veterinary Medicine, [2]Department of Veterinary Microbiology, [3]Department of Veterinary Public Health and Preventive Medicine, College of Veterinary Medicine,Federal University of Agriculture, Abeokuta, Ogun State, Nigeria.*Corresponding author. Email: amelia.eleazar@yahoo.com. . Mobile: +2348035064771

SUMMARY

Neonatal piglet mortality (NPM) up to seven days of life causes major pig production losses worldwide. A structured questionnaire survey was administered on 151 pig farmers in Lagos State, Nigeria, for information on NPM on their farms. Subsequently, Focus Group Discussions and In-depth interviews were carried out to clarify the points that appeared not to have been sufficiently addressed by questionnaire respondents. Accruing data were analyzed using descriptive statistics and multiple regressions. Of all the151 respondent farmers, 66.9% were males and 76.8% were above 45years of age, herd sizes were 1-100 pigs (50.3%), 101-200 pigs (32.5%), over 200 pigs (17.2%) representing small, medium, and large scale producers respectively. General management practices of the farmers were rated as good (42.5%) or poor (57.5%).The overall NPM was40.2%.Of this, 90.1% occurred during the rainy season months with the highest rate (62.9%) being recorded in the month with the lowest mean ambient temperature. Farmers' identified the causes of NPM as diarrhoea (42.4%), starvation (27.2%), crushing (23.8%), congenital abnormalities (3.3%) and unknown cause (3.3%).The major clinical signs that farmers observed in neonatal piglets were diarrhoea (92.1%), respiratory distress (7.3%) and failure to suckle (9.4%). Care of new born (CNB) was rated as poor in 70.9%and good in 29.1% of the farms, while management of pregnant pigs (MPP) was adjudged poor on 66.2% and good on 33.8% of the farms. Significantly, CNB (p<0.001), MPP (p<0.001), feeding and watering (p<0.001) and production practice (p<0.007) were negatively correlated with NPM while Farmer's experience (p<0.009) was positively correlated with NPM. The study highlighted the need for the institution of improved protocols for MPP, farrowing and CNB in order to minimise NPM on the farms.

Keywords: neonatal, piglets, mortality, Nigeria.

INTRODUCTION

Pig production in the developing countries such as Nigeria has high potentials for job creation, high profitability and food security. Unfortunately, the pig industry in Nigeria is faced with various challenges,including diseases and poor management (Ogunniyi and Omoteso, 2011).High piglet mortality has been identified as one of the major factors limiting pig productivity in commercial pig farms in Nigeria (Eleazar *et*

al., 2020). The profitability of pig production largely depends on the survival of new born pigletsup to weaning. Neonatal piglet mortality (NPM)remains a major economic issue in pig production worldwide (Roy *et al.,* 2014, Mainau *et al*., 2015).For instance, in the European Union, a farmer incurs an average of 20% neonatal mortality per litter of piglets, due to the loss of about 3 piglets per litter twice per year (Anonymous, 2016). This has prompted investigations not only into the causes of neonatal deaths but also into the factors which affect the viability of newborn piglets (Rootwelt *et al*., 2013; Roy *et al*., 2014; Newcom *et al*., 2017).

Frazer, (1990) defined neonatal mortality in pigs as death that occurs in piglets within the first week of life. Varley, (1995) observed that improvement in the litter size of improved pig breeds is accompanied by neonatal mortality of up to 13%.According to Pathiraja *et al*. (1987), neonatal mortality up to one week *post partum* in small holder farms at southern Zaria, Kaduna State, Nigeria, was as high as 50%. A study on pre-weaning piglet mortality in exotic and indigenous breeds in Ibadan Southwest Nigeria, reported NPM rate of 26.9% and 37.9% in exotic and indigenous breeds respectively (Uko *et al*., 1994).

Several studies have attributed neonatal mortality in pigs to many factors, including a lack of or inadequate ingestion of colostrum (King, 2012, Le Dividich *et al*., 2005), savaging (Mondal *et al*., 2012), starvation, hypothermia and crushing by the sow (Mainau *et al*., 2015, Dyck and Swierstra 1987), asphyxia (King, 2012, Mota-Rojas *et al*., 2012), poor management practices (Nguyen *et al*., 2011; Lay, 2002), low birth weight (Ekert *et al*., 2017). Some of the causes are directly related to the sows while others are related to the piglets (van Dijk *et al*., 2005, 2006; Alonso-Spilsbury *et al*., 2007). There is paucity of information on neonatal piglet mortality and its causes in Lagos State, southwest Nigeria. The purpose of this work is to investigate the causes of neonatal piglet mortality and the associated predisposing factors in commercial pig farms in Lagos State, southwest Nigeria.

MATERIALS AND METHODS
The Study Area
The study was conducted, from December 2018 to December 2019, on two 80-hectare pig farm estates: Oke Aro and Gberigbe pig farms with the coordinates of 6º41'34"N, 3º19'30"E and 6º36'28"N, 3º37'56"E respectively, established by the Lagos State Government. Portions of the properties were allocated to private farmers exclusively for pig production. During the study period, there were over 1200 pig farmer-holders operating on the estates. Lagos State is situated in South–Western Nigeria, with the coordinates of 6º35'N, 3º45'E, covering an area of 3,577 sq. km (Anonymous, 2020a), with a projected population of 12.5 millionsin 2016 (NBS, 2017). Lagos State experiences two distinct seasons: a rainy season and a dry season. The monthly mean minimum and maximum ambient temperatures within the period of study were 21.7°C and 33.1°C for August and February respectively. The monthly average minimum and maximum rainfalls were 14.3mm (January) and 312.2mm (June) respectively. The lowest and the highest number of rainy days were 1.4 days and 16.2 respectively (Anonymous, 2020b).

Data Collection
The Management Committee of the farm estates was intimated with the purpose of the survey and approval and support obtained from it. Information was thereafter disseminated to the pig farmers, by both the Management and Study Team. One hundred and fifty one pig farmers were selected based on their willingness to participate in the survey. The selected farms comprised of both breeding alone and farrow-to-finish production types. Data was collected using a prepared structured questionnaire. The structured questionnaires were filled by the farm owners. Also Focus Group Discussions

and In-depth interviews were carried out to clarify the points that appeared not to have been sufficiently addressed by questionnaire respondents.

The Questionnaire

The questionnaire was structured as follows:

i. Socioeconomic characteristics of the Respondent,
ii. The farm characteristics,
iii. Neonatal piglet mortality and pattern,
iv. Reproductive performance,
v. General management practices,
vi. Management of pregnant pigs and farrowing, and
vii. Care of newborn piglets.

Pig herd sizes were classified as small (1-100 pigs), medium (101- 200 pigs), and large (200 pigs and above).

The general management practices section was further divided into the following subsections:

i. Facilities on farm, which had a set of four questions,
ii. Feeding and watering, had four questions,
iii. Health care, had eight questions,
iv. Biosecurity and hygiene, had 12 questions, and
v. Production practice had four questions.

To assess the quality of general management practice, a score was computed to evaluate the respondents under the various subsections. Each question had either zero or one point, thereby resulting to the maximum obtainable points of 32, distributed according to the number of questions in each subsection. Respondents that had 0-2 points and 3-4 points (in the questions with maximum obtainable points of 4) were rated poor and good respectively. Those that had 0-4 and 5-8 points (in the questions with maximum obtainable points of 8), were rated poor and good respectively, while in the questions with maximum obtainable points of 12, respondents that had 0-6were rated poor and those that had 7-12 were rated as good.

The assessments for the quality of management of pregnant pigs and care of newborn were done in same manner. The maximum obtainable points and ratings for management of pregnant pigs were 6 points, 0-3 rated poor, 4-6 rated good. Whereas the maximum obtainable points and ratings for care of new born were 11 points, 0-5 rated poor and 6-11 rated good.

The data obtained from the demographic and socioeconomic information about the farmer, farm characteristics, neonatal mortality pattern and reproductive performance of herd were presented in absolute values and percentages, which were used to generate summarized results in tables.

Data Analysis:

Percentage neonatal piglet mortality was calculated as:

%NPM = ANPD/ALBP*100

Where:

ANPD = Average no. Neonatal Piglets Dead/litter

ALBP = Average no. Live Born Piglets/litter

Neonatal period is defined as the period within the first 7 days of life of the piglets.

Data were coded and entered into Excel spreadsheets. Descriptive statistics were used to identify trends. Multiple regression analysis was used to determine the variables significantly affecting neonatal piglet mortality rates, using the stepwise method. Statistical package for Social Sciences (SPSS) version 26(IBM® SPSS® Statistics) was used to analyse data.Correlation coefficients were calculated by Pearson method. A $p<0.05$ was considered significant. The regression model was set as:

$$Y= \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + U$$

Where:

Y = Neonatal piglet mortality rate
α = Constant term
$\beta_1 – \beta_5$ = regression coefficient
X_1 =Care of Newborn

X2 = Management of in-pigs and farrowing
X3 = Feeding and watering
X4 = Production practice

X5 = Farmer's years of experience
U= error term

RESULTS

The farm characteristics

The data based on the characteristics of the farm is presented in Table 1. The source of labour in 93.4% of the farms was hired. The hired labours were majorly involved in the cleaning of the pens, feeding of the pigs, loading and off loading of animals and feed ingredients and in some farms treatment of animals. In a few (7.3%) of the farms where the owners were public servants (7.3%), the hired labours managed or supervised the farms. In cases where the owners were solely pig farmers (63.6%) or engaged in pig farming cum trading (25.2%), the owners managed and saw to the day to day running of their farms. Of all the farm workers, 62.9% were females while 37.1%weremales. Of all the pig farmers, 50.3 %(with herd sizes of 100 pigs or less) were classified as small scale farmers, 32.5% (with 101-200 pigs) as medium scale farmers, and 17.2%(with herd sizes of over 200 pigs), as large scale farmers.A very large portion of the farms (98.0%) were involved in breeding and fattening. Most farms had female workers only (46.6%), 38.4% had both males and females and 15.2% had male workers only. The most commonly used breeds were various Crosses and the Large White which were present on 41.0% and 35.3% of all the farms, respectively.

Socioeconomic characteristics of the respondent

The distribution of respondents based on the socioeconomic characteristics of the farm owner is shown in Table 1. Majority of the pig farmers in the area were males (66.9%). Most of the farmers were within the ages of 46 and 55years. Most of them have tertiary education (80.1%), 63.6% are fully engaged in pig farming while the rest combined pig farming with other occupations.

Neonatal piglet mortality and pattern

The findings on neonatal piglet mortality and pattern, presented in Table 2, shows that 94.0% of the neonatal deaths occurred after farrowing, with 82.15% occurring from birth to 7 days of age. Majority of the deaths (90.1%) occurred during the rainy season, and 62.9% died in the month of August. The major signs the farmers observed in the piglets that died were diarrhoea (92.1%), other signs include failure to suckle (9.4%), and respiratory signs (7.3%). The farmers' identified causes of mortality of neonatal piglets are; diarrhoea (42.4%), starvation (27.2%), crushing (23.8%), congenital abnormalities (3.3%) and unknown cause (3.3%).

TABLE I. Farm and respondents' socioeconomic characteristics

Variables	Frequency	Percentage (%)	Mean
Production type			
Breeding alone	3	2.0	
Breeding and fattening	148	98.0	
Herd size			116.5
1 – 100	76	50.3	
101 – 200	49	32.5	
Above 200	26	17.2	
Pig breeds by number of farms			
Duroc	15	4.5	
Large white	118	35.3	
Crosses	137	41	
Indigenous	32	9.6	
Camborough	21	6.3	
Landrace	11	3.3	
Sex of Pig Farm Owners			
Male	101	66.9	
Female	50	33.1	
Age (Years) of Pig Farm Owners			45.5
26 – 35	8	5.3	
36 – 45	27	17.9	
46 – 55	59	39.1	
Above 55	57	37.7	
Level of Education of Pig Farmer Owners			
Primary	4	2.6	
Secondary	26	17.6	
Tertiary	121	80.1	
Years of Experience of Pig Farm Owners			9.1
0 – 5	35	23.2	
6 – 10	43	28.5	
Above 10	73	48.3	
Occupation of Pig Farmer Owners			
Pig farming only	96	63.6	
Pig farming cum Trading	38	25.2	
Pig farming cum Public servant	11	7.3	
Source of labour			
Hired (Hirlings)	141	93.4	
Family	10	6.6	
Sex of Hirlings			
Males	96	37.1	
Females	163	62.9	
Category of farms based on sex of hirlings			
Farms with only male hirlings	23	15.2	
Farms with only female hirlings	70	46.6	
Farms with both male and female hirlings	58	38.4	

TABLE II. Piglet mortality and pattern

Variables	Number	Percentage (%)
Prevalence of perinatal mortality		
Death before farrowing	2	1.3
Death during farrowing	7	4.7
Death after farrowing(0-7 days)	142	94.0
Age at death of live-born piglets (days)		
0 -2	32	21.2
3 – 7	92	60.9
Above 7	27	17.9
Season of the year in which piglets die		
Rainy	136	90.1
Dry	15	9.9
Signs noticed in piglets before death		
Diarrhoea	124	92.1
Failure to suck	13	9.4
Respiratory difficulty	11	7.3
Others	2	1.3
Causes of death of neonatal piglets		
Diarrhoea	64	42.4
Starvation	41	27.2
Crushing	36	23.8
Congenital abnormalities	5	3.3
Others	5	3.3

<u>Reproductive performance of the herds</u>
The data obtained from the farmer's records on the reproductive performance of the herds are presented in table 3. Average number of farrowing per sow per year was 2.00 ± 0.00, average litter size was 8.72 ± 1.49, average number of live born piglets/litter was 8.57 ± 1.44, average number of neonatal piglets dead per litter was 3.43 ± 1.15 and average number of piglets surviving neonatal period per litter was 5.14 ± 1.53.The average neonatal piglet mortalitywas40.2%.

TABLE III. Reproductive performance of herd

Parameters	Mean	Std. Deviation
Average No. of farrowing/sow/year	2.00	0.00
Average litter size	8.72	1.49
Average No. of live-born piglets/litter	8.57	1.44
Average No. of neonatal piglets dead/litter	3.43	1.15
Average No. of piglets surviving neonatal period/litter	5.14	1.53
Average weaning age (in weeks)	8.01	0.14
Average No. of piglets weaned /litter	4.70	1.48

%NPM =Average no. neonatal piglets dead/Average no.
live born piglets*100 = 40.2%

General management practices
The results of the rating of the various farm management practices are presented in table 4. On farm facilities, 56.3%was rated adequate, 13.9% rated good in biosecurity and hygiene, 60.9% rated adequate in feeding and watering, 59.6% rated good in health care and 29.1% rated good in production practice. In the total average rating for general management practice, 42.5% of all the farms rated good while 57.5% rated poor.

Management of pregnant pigs and Care of newborn piglets
In the management of pregnant pigs and farrowing, 33.8% had good rating while 66.2% had poor rating. The ratings for care of new born piglets were 29.1% and 70.9% representing good and poor rating respectively.

TABLE IV. Assessment of Farm management practices

Assessment of Variables	Frequency	Percentage (%)
Farm facilities		
Inadequate	66	43.7
Adequate	85	56.3
Biosecurity and hygiene rating		
Poor	130	86.1
Good	21	13.9
Feeding and watering		
Inadequate	59	39.1
Adequate	92	60.9
Health care		
Poor	61	40.4
Good	90	59.6
Production practice		
Poor	118	78.1
Good	33	21.9
Management of in-pigs and farrowing		
Poor	100	66.2
Good	51	33.8
Care of new born piglets		
Poor	107	70.9
Good	44	29.1
Overall management practice		
Poor	87	57.5
Good	64	42.5

Multiple regression analysis
Table 5 shows the result of the multiple regression analysis. The overall regression model was significant (F = 26.078; P<0.000 accounting for 45.5% adjusted R-squared) of the variance. All the variables presented in the model had significant effects on neonatal piglet mortality rate. Other variables not presented had no significant effects on the neonatal piglet mortality rate.

TABLE V. Multiple Regression analysis of variables affecting neonatal pig mortality rate in pig farms, Lagos State

Model	Unstandardized Coefficients		t	Sig.
	B	Std. Error		
(Constant)	2.638	0.149	17.759	0.000[*]
Care of Newborn	-0.585	0.123	-4.741	0.000[*]
Management of in-pigs	-0.735	0.169	-4.346	0.000[*]
Feeding and watering	-0.332	0.096	-3.442	0.001[*]
Production practice	-0.309	0.113	-2.726	0.007[*]
Farmer's experience	0.155	0.059	2.637	0.009[*]

Dependent Variable: Neonatal Piglet Mortality; R Square = 0.473; Adjusted R Square = 0.455; F-value = 26.078; $p \leq 0.05$
[*]Significant

DISCUSSION

Previous studies on neonatal piglet mortality conducted in Oyo and Kaduna States of Nigeria recorded neonatal piglet mortality (NPM) of 50% (Pathiraja *et al*., 1987), 26.9% in exotic breeds and 37.9% in indigenous breeds (Uko *et al*., 1994). Hence this study provides additional information on factors affecting NPM in Lagos State Nigeria. This study revealed an average neonatal piglet mortality of 40.2% among pig farmers in Lagos State. This is higher than those reported by Uko *et al*. (1994) for the indigenous and exotic breeds, but lower than the report of Pathiraja *et al*. (1987). In comparing with those reported in other countries and regions, it is far higher than 20% reported for the European Union (Welfare Quality, 2016), 17.1% for Sweden, (Olsson *et al*., 2018), 8.8% for Thailand (Nuntapaitoon *et al*., 2018) and 15.62% for India (Roy *et al*., 2018). Neonatal piglet mortality varies from herd to herd and from country to country. This variation may probably be due to the variations in genetics of the pigs and farm level management practices in the farms.

This study revealed that there were more male pig farmers (66.9%) than females (33.1%). This is consistent with the findings of Uddin and Osasogie (2016) and Nwanta *et al*. (2011). The reason for this may be ascribed to two factors; the control of decision and income and sometimes the entire business shifts to men when livestock enterprise scales up and secondly, all smallholders face challenges when the livestock sector intensifies and concentrates and many go out of business (FAO, 2011). But interestingly this study also showed that females are more involved in the supply of labour for farm operations in the area than men. Of all the farm workers in the study, 62.9% were females while 37.1% were males and 93.4% of all the work force was hired. Furthermore, majority of the farms, 46.6% had only female workers, 15.2% had only males while 38.4% had both males and females working for them. This finding is in agreement with the FAO (2011) report that women make essential contributions to agriculture and rural enterprises across the developing world. This could also be that farmers in the area may have a preference for female workers than male workers. The mean age of the farmers in the area was 45.5 years. This is higher than 40 years reported by Uddin and Osasogie (2016), but lower than 49 years reported by Ozor *et al*. (2010).

This implies that majority of the farmers in the study were still within their economically active age. It is important to also note that 80.1% of the farmers in the study were highly educated and in agreement with the findings of Uddin and Osasogie (2016), and Nwanta *et al*. (2011), who recorded high level of literacy among the sampled farmers. This study also revealed that the mean number of years of pig farming experience was 9.1 years. This is in agreement with the findings of Oguniyi and Omoteso (2011), who in their studies recorded more than 70% of pig farmers with over five years of experience, and in contrast with Uddin and Osasogie (2016), who reported that most of the farmers had less than five years of farming experience. In this study, there is an indication that the farmers had fairly long experience in pig production which combined with their level of education, should facilitate the capacity to understudyand be proficient in modern pig farming technologies and improved management protocols, and their adoption and adaptation to the local environment, which can result to a sustainable development of the Nigerian pig industry.

The study further revealed that majority (98.0%) of the farmers practiced breeding and fattening. The reason for this may be to maximize profit in the enterprise. Furthermore, most (63.6%) of the farmers were fully engaged in pig farming only, while another 25.2% combined pig farming with trading. These two classes of farmers operated their farms by themselves with the assistance of hired workers. The remaining 7.3% had some other occupations they were involved in and were mostly absent and occasionally came in to check on the farms which were usually run by hired workers. The reason for this may be to raise more capital for their pig business, before becoming full time pig farmers. Most of the farms studied were stocked with Large White and cross breeds. This is because these breeds are more prolific and attain weaning and market weights faster than the indigenous breeds, and were also used to upgrade the indigenous breeds.

The findings on the neonatal mortality patterns based on the farmer's responses showed that majority of the mortalities occurred after farrowing, that is, among the live-born piglets. Those that occurred during farrowing were mostly the stillbirths and made up 4.7% of the total mortalities. Whereas the deaths that occurred before farrowing included the abortions and the mummified foetuses, and was only 1.3% of the total mortalities in the study area. Among the neonatal deaths, 82.1% occurred within the first week of life. This is in agreement with the reports of Moustsen *et al*. (2013) that the typical pattern of piglet mortality has 81% of them occurring within first week after farrowing and Hughes (1993) who also noted that 90% of all neonatal piglet mortalities were within one week of parturition. Majority (90.1%) of the farmers in this study indicated that these mortalities occurred during the rainy season and in the month of August which was associated with the highest precipitation and the lowest ambient temperature. This may thus be an indication of seasonal influence, which may be related to the lowest average temperature or chilling of the piglets during rainstorm. This is in contrast with the findings of Uko *et al*. (1994), who in their study did not notice any seasonal influence on piglet mortality. But Herpins *et al*. (2002) in their study showed that piglets have a lower limit ofthethermoneutralzoneat2hours oflifecloseto34 °C and Vasdal *et al*. (2010) also reported that piglets of this age are also attracted to heat and prefer temperatures in excess of 30°C.Generally, new born piglets are very sensitive to cold stress, due to inability to regulate their body temperature at birth, they have little or no subcutaneous fat reserves and without hair on the body for insulation. Therefore, they require a warm and dry environment for survival, especially during the first days after birth. Baxter *et al*. (2009) established in their study that cold stress is the most important stressor in new

born piglets. It was observed in this study, while rating care of new born piglet that there was no farmer's affirmative answer on the provision of heat for the newborn piglets immediately after birth. This means that it is not part of the management practice in the area of study.

This study also revealed that diarrhoea was a major issue in the study area because 92.1% of the farmers were of the opinion that diarrhoea is the major signs observed in the piglets that died. It was also the most common cause of neonatal piglet mortality, representing 42.4% of all causes in the area. We intend to conduct further studies on neonatal piglet diarrhoea. Uko *et al*. (1994) reported diarrhoea as the third major cause of neonatal piglet mortality. The high diarrhoea in this study was obviously a management issue, and may be attributed to the poor biosecurity and hygiene, poor production practice and poor care of new born observed in the study. The other important causes of neonatal piglet mortality observed were non-infectious and included starvation mostly due to agalactia in the sow and crushing. This will also be investigated further.

This study showed that the average litter size in the study area was 8.72 ± 1.49 piglets. This is higher than what was obtained in previous studies within Nigeria; 8.1 in Northern Nigeria (Rekwot *et al*. (2001) and in the South West, 9.8 which is higher than that obtained in this study (Uko *et al*., 1994). In comparing with what is obtainable in other developed countries, it is far much lower than the average liter sizes of 15.8 in Netherlands, (Soede and Kamp, 2019), 14.8 in Denmark and 11.5 in the UK, (Rutherford *et al*., 2013). The lower litter size observed in this study may be due to genetics and management factors. Majority of the farmers (41%) use varieties of cross breeds in their pig production. The consequence of this uncontrolled breeding is that with time, the offspring will begin to lose some important traits such as litter size. The key management factor that can affect

litter size is nutrition. Poor nutrition will cause the sow or gilt to release fewer number of ova and fewer number of foetuses that will survive till farrowing. It was observed in this study that in the assessment of quality of management of pregnant pigs, only 30.5% (data not shown) of the farmers gave affirmative answer to the question on the practice of gestation and lactation feeding. Majority of the farmers (69.5%) gave their breeding animals the same type of feed all year round irrespective of the physiological status of these animals. Also in the overall rating of the management of pregnant pigs and farrowing, only 33.8% had good rating while 66.2% had poor rating.

It was also revealed in this study that the variables that had statistically significant effects on neonatal piglet mortality were: Care of new born piglets, Management of in-pigs, Feeding and watering, Production practice and Farmers years of experience. The other variables were removed from the regression model since their effects were not statistically significant. Care of new born piglets had the greatest effect on neonatal piglet mortality rate, followed by Management of in-pigs, Feeding and watering while Production practice, (which included practice of batch farrowing, all-in-all-out system, close weight range of piglets on entry to nursing, availability of a production plan in the farm) and Farmers years of experience had the least effect. The first four variables above are the key farm level management practices which all had negative correlations with neonatal piglet mortality rate. This means that as the rating in these management practices improved, neonatal piglet mortality rate reduced. Therefore, in order to reduce neonatal piglet mortality rates, farmers in the study area must aim improving these areas especially in the Care of newborn piglets and management of in-pigs because they had the highest contribution to the neonatal piglet mortality. It is important to also note that Farmers' years of experience had a positive

correlation with neonatal piglet mortality, meaning that an increase in the number of years of farmer's experience resulted to an increase in the mean mortality of the neonatal piglets. This is unexpected because naturally, the more experienced a farmer is, the better he is able to reduce neonatal piglet mortality in his farm. But that was not the case here, despite the fact that the majority of the farmers have pig farming experience above ten years, and the mean number of years of experience is 9.1 years, yet majority of them rated very poorly in the key management practices that are predictive of neonatal piglet mortality, especially in Care of new born and Management of in-pigs, which are the highest predictors of neonatal piglet mortality in this study. The reason for this may likely be that the hired workers who actually take care of the pigs may not be equally experienced, educated or committed.

The provision of the pig farm estates by the Lagos State Government, and with the current estate operations procedures and policies have created a huge ready-made market for the producers. This has attracted buyers from across the country and from neighboring countries. Therefore, there is high potential for the pig farmers in Lagos state to maximize profits by increasing the average number of piglets surviving the neonatal period and up to weaning per litter. Thus based on the findings in this study, it is recommend that the pig farmers in Lagos State should adopt a management protocol that will include gestation and lactation feeding program for the breeding sows and gilts, provision of creep area in the farrowing rooms and creep feeding for the piglets. Also, all workers should be trained to monitor farrowing and provide extra care for the needy newborn piglets, and for all the other piglets throughout the neonatal period.

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