



VACCINATION IN LIVESTOCK PRODUCTION: A VERITABLE TOOL IN THE CAMPAIGN FOR FOOD SECURITY IN NIGERIA. A REVIEW

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Abstract

The impact of diseases and its outbreak on livestock production has necessitated the need for vaccination in livestock production. Farmers worldwide are embracing the use of animal vaccines to improve health of animals and reduce losses resulting from animal diseases. This is crucial so as to ensure food security and meet the demand of the growing global population for livestock products. Livestock accounts for one third of Nigeria's agricultural GDP. Animal vaccination continues to play a key role in disease control programmes in livestock production and may also aid in the responsible use of antibiotics. Investment in making vaccines available to farmers and innovative research into development of effective and safe veterinary vaccines is highly recommended for continued benefit to livestock production, so as to increase the production of safe and affordable livestock products in Nigeria. Recent studies have recommended continued research, awareness, development and availability of vaccines in the rabbit, pig, cattle and poultry industries in Nigeria. These can be achieved through collaborative efforts of stakeholders of veterinary health in Nigeria.

Keywords: Vaccination, Livestock, Veritable, Tool, Food Security.

Introduction

Livestock account for one third of Nigeria's agricultural GDP. It provides income, employment, food, farm energy, manure, fuel and transport. Livestock is also a major source of government revenue. . From the year 1961 to 2011, average meat consumption in the world increased from 23 to 43kg per capita/year, while milk consumption increased from 75 to 87 kg per capita/year (FAOSTAT. 2013). Meat and milk production is also consistently increasing at approximately 2.2% per year. Several studies demonstrate the importance of inherent losses from infectious animal diseases and emerging zoonotic risks threatening humanity. The death of a single animal can have dire consequences on vulnerable households by reducing their ability to withstand food crises and to emerge from poverty. (Comfort et al., 2018; FAO, 2016). This can cumulatively affect the gross economy of a nation, most importantly, developing countries like Nigeria still grappling with high poverty level.

According to Fadiga et al., 2013, it was estimated that Newcastle disease (NCD) in unvaccinated village poultry has 45% background mortality. Peste des petits ruminants (PPR) in sheep and goats, Contagious Bovine pleuropneumonia (CBPP) in cattle and African swine fever (ASF) in pigs have background morbidity rates of up to 50%, with mortality rates of about 50% for PPR, 25% for CBPP and 100% for ASF. The report indicated the following as the livestock losses recorded in Nigeria as a result of vaccinable diseases; Newcastle disease, Peste des petits ruminants, contagious bovine pleuropneumonia, African swine fever and Trypanosomiasis.

(N million)

Value of dead animals – 17,841



Treatment cost - 3376

The overall financial burden of the five diseases on the national economy in 2009 was N29.2 billion, while the model outputs indicated that the cost of targeted intervention was N15.5 billion with 28.4% devoted to vaccination. The report states that the loss analyses include: 50percent in Newcastle disease in chickens and 80percent in small ruminants, which leads to decreased productivity including decreased quantity and quality of eggs, decreased milk yield, increased calf mortality, poor growth rate and increased calf mortality among others.

Proper vaccination of livestock could have prevented this colossal economic loss credited to only five animal diseases. The loss was not only limited to financial terms but also includes loss in food and nutrition which could have been available to feed the human population.

Among all the livestock that makes up the livestock in Nigeria, ruminants, comprising sheep, goats and cattle, constitute the livestock largely reared by farm families in the country's agricultural system. Nigeria's livestock population comprises 34.5million goats, 22.1million sheep and 13.9million cattle (Lawal-Aebowale, 2011). These agricultural resources possess great economic values which must be protected in order to sustain steady growth in the agricultural sector of the economy, and avert losses that can lead to huge deficits in animal-based food.

Vaccination practices is a tool that can be employed in preventing such losses. Vaccinating 70% of animal population against these animal diseases will ensure herd immunity and subsequent protection of the animal population and humans from them. Nigeria produces only a few veterinary vaccines which is not sufficient to address animal health issues in our country. For example, vaccines are yet to be produced to face certain challenges in the rabbit production industry which is in its infancy (Ume *et al.*, 2016; Table 1). There is therefore the need for continued investment in animal vaccine research; improved image of veterinary vaccine and its use through campaigns, legislation and policies that support its coverage. (Musa *et al.*, 2013).

Table 1: Information on Emerging Diseases in Nigeria and Availability of their Vaccines in Nigeria.

Animal	Disease	Vaccine developed	Developed in Nigeria	Accessibility to village farmers in Nigeria
Cattle	Lumpy Skin Disease	Yes	No	No
Rabbit	Hemorrhagic disease	Yes	No	No
Pig	African Swine fever(ASF)	No	No	No
Chicken	Avian influenza(HPA1)	Yes	No	No

Source: (Agnes et al., 2018; Lawal-Adebawale, 2011 and Oluwole et al., 2012).

Vaccination research in Nigeria and focus for future research



In recent times, rabbit farming has been encouraged as its meat is a rich source of protein, low in cholesterol, have rapid growth rate as in broiler chicken and therefore can be a fast source of income to farmers and improve food security in Nigeria. However, Nigerian farmers are faced with challenges of untimely death of fryers from infectious diseases and parasites of rabbits not known to the extension agents who could enlighten them since rabbit farming is in its infancy in Nigeria (Baruwa, 2014).

Vaccines have been developed to protect poultry from fowl typhoid and cholera diseases (NVRI, 2016). However, continued research can be carried out on brucellosis. The research carried out by Joseph *et al.*, 2018, in Anambra State reveals that there is an urgent need for control programme against avian brucellosis which frequently cause enormous loss in animal agriculture in Nigeria. Also, development of thermostable Newcastle disease vaccine to support poultry industry in Nigeria, where there is no stable electricity supply to keep the cold chain of vaccines (Shahid Mahmood *et al.*, 2014) although in 2008, a field trial of Malaysian thermostable Newcastle disease vaccine was carried out in village chickens in Kaduna State, Nigeria (Nwanta *et al.*, 2008).

More vaccination research on bovine brucellosis is required in Nigeria. The study carried out in Adamawa, Kaduna and Kano states, northern Nigeria and Enugu state, South east Nigeria revealed a high prevalence of brucellosis in cattle herds (Hassanet *et al.*, 2012; Samuel *et al.*, 2018). Also, a recent research on *Mycobacterium bovis* in cattle by abattoir surveillance in Bauchi and Gombe states revealed its high prevalence, urgent and intensive investment in *Mycobacterium* vaccination is important; especially because of its zoonotic potential (Ibrahim *et al.*, 2018). According to Adedeji *et al.*, 2017, twenty-three (23) Holstein Friesian calves died during repeated outbreaks of lumpy skin disease (LSD) with estimated value of N3, 180, 000 (\$17,377.05) in the year 2010, 2013 – 2014 on a dairy farm in Jos, Nigeria. The outbreak of lumpy skin disease was also recorded in 2016 in Sokoto Gudali and Holstein Friesian cross in a dairy farm in Nasarawa State; caused by Lumpy skin disease virus (LSDV) of the genus capripoxvirus; which requires animal health workers attention as reported by Adedeji *et al.*, 2018.

Worldwide Porcine Reproductive and Respiratory Syndrome virus (PRRSV) and porcine parvovirus (PPV) are known to infect and cause economic loss in the pig industry, according to Comfort *et al.*, 2018. Vaccination against these viruses are not yet available in Nigeria. However, the study conducted on the prevalence of PRRSV and PPV antibodies in 368 commercial pigs in Southwest, Nigeria revealed 53.8% and 36.1% antibody prevalence of PRRSV and PPV respectively. (Comfort *et al.*, 2018) Therefore, there should be continuous monitoring of this virus in pigs in Nigeria for early detection, awareness and control measures. A study conducted by Aiki-Raji *et al.*, 2018 revealed that pigs in Ibadan, southwest Nigeria shows infection from porcine circovirus type 2 (PCV2) which is one of the major agents of mortality in the swine industry. This indicates that the pigs are carriers of the virus, and there is no routine vaccination against it. It is therefore recommended that Nigeria conduct continuous surveillance of the PCV2 in pigs for control measures. Porcine pneumonia is also of economic importance in pig industry in Nigeria, the study conducted on pigs from farms in Lagos, Osun, Oyo and Ogun revealed high prevalence of bronchointestinal pneumonia. Knowledge of the causative agents and production of vaccines to protect pigs should be considered in Nigeria (Emikpe *et al.*, 2018).

Recommendation

With the consistently growing human population in Nigeria, food security is seriously challenged and must be addressed quickly. All stakeholders must promote livestock vaccination to improve



herd immunity against diseases, promote livestock health, thereby increasing animal-food production and by extension, human health.

Conclusion

The availability of veterinary vaccines in Nigeria should be a key priority for the Veterinary Medicines and Allied Product and the National Veterinary Research Institute, VOM in charge of veterinary vaccines with the continued support of government; in order to prevent animal diseases, protect public health and also provide healthful and affordable food.

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