Knowledge, Attitude and practices of Animal Health Workers Towards Surveillance and Disease Reporting in Niger State, Nigeria

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ABSTRACT

Background: *Animal disease surveillance and reporting depend largely on the competence and commitment of frontline animal health workers. Nigeria established the National Animal Disease Information and Surveillance (NADIS) system to standardise reporting, but delayed and incomplete reporting, weak feedback and limited resources persist. Evidence on the knowledge, attitudes and practices (KAP) of veterinary and para-veterinary personnel towards surveillance and disease reporting (SDR) is scarce, particularly in Niger State.* ***Aim:*** *To assess the knowledge, attitudes and practices of animal health workers towards SDR in Niger State, and the availability of the tools needed for it.* ***Methods:*** *A mixed-methods cross-sectional survey was conducted among public veterinarians (n = 25) and para-veterinarians (n = 108) in Niger State. A pre-tested, structured questionnaire adapted from the NADIS reporting formats was administered by convenience sampling, with a minimum sample of 99 calculated by the Taro Yamane formula. Of 120 questionnaires administered, 100 were retrieved and analysed with descriptive statistics in Microsoft Excel. In-depth interviews with the Director of Veterinary Services, the State Epidemiology Officer and the State Epidemiology Lead provided context and triangulation.* ***Results:*** *Respondents were mostly male (77%) and para-veterinarians (82%). Knowledge of the reporting tools was poor: on average 36.9% knew the content of the Monthly Abattoir Report, Disease Outbreak Details form and Surveillance Summary Report, against 62.8% who did not. Attitudes were largely positive: 81% attached great importance to SDR and 86% said it should be encouraged. Practice was weak, with 69–80% unable to perform core tasks such as trend analysis or calculating incidence and prevalence. Tools were scarce: the Surveillance Summary Report was unavailable to 84% of respondents, and 80% reported no Epidemiology Officer.* ***Conclusion:*** *Positive attitudes provide a foundation for strengthening SDR in Niger State. Training, provision of tools and incentives are needed to close the knowledge, practice and resource gaps.*



Keywords: Animal, Disease, Health, Knowledge, Attitude, Reporting, Surveillance

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INTRODUCTION

Although considerable literature exists on disease surveillance and reporting, much of the available evidence focuses on human health surveillance systems or evaluates operational challenges within surveillance programme (Isere *et al.*, 2015; Phalkey *et al.*, 2015; Belete *et al.*, 2022). Relatively few studies have empirically examined the KAP of veterinary and para-veterinary personnel involved in animal disease surveillance, particularly in Nigeria. The few available KAP studies of frontline workers, largely on zoonoses such as brucellosis, come mainly from East Africa (Nabirye *et al.*, 2017; Mligo *et al.*, 2022), while evidence on animal disease reporting in Nigeria is largely limited to the operational constraints of reporting systems (Bolajoko *et al.*, 2009). Existing studies provide limited insight into whether frontline animal health workers possess the knowledge, motivation, and resources required to implement the NADIS system effectively. This represents an important evidence gap because assumptions regarding workers' preparedness may conceal weaknesses that compromise surveillance performance.

The Nigerian context adds further complexity. Animal and human disease information systems have developed largely in parallel, with weak communication between ministries except during zoonotic outbreaks (Okoli, 2021). Recent work in north-central Nigeria points to knowledge gaps among frontline health workers regarding emerging zoonotic diseases and recommends strengthened surveillance and targeted training (Ghali-Mohammed *et al.*, 2025), and One Health training that brings clinicians, veterinarians and environmental scientists together has been proposed to build interprofessional capacity for outbreak response (Shehu *et al.*, 2024).

Niger State, with its large livestock population and active veterinary service network, is a strategic component of Nigeria's animal disease surveillance framework. However, there is limited empirical information on the knowledge, attitudes, and practices of animal health workers regarding disease reporting and surveillance within the state. Addressing this gap is critical for identifying barriers to effective surveillance and informing targeted interventions. Therefore, this study assessed the knowledge, attitudes, and practices of veterinary and para-veterinary personnel towards disease reporting and surveillance in Niger State, Nigeria. The findings are expected to provide evidence for strengthening surveillance capacity, improving reporting quality, and enhancing the overall effectiveness of the NADIS system. The objectives of the study are to: determine the level of knowledge of veterinary and para-veterinary personnel on disease reporting and surveillance requirements under the National Animal Disease Information and Surveillance (NADIS) system in Niger State; assess the attitudes of animal health workers towards disease reporting and surveillance activities in Niger State.; Evaluate the disease reporting and surveillance practices of animal health workers in Niger State.; Assess the availability and adequacy of surveillance resources and reporting tools required for effective disease reporting and surveillance among animal health workers in Niger State and to identify factors influencing the effectiveness of disease reporting and surveillance among veterinary and para-veterinary personnel in Niger State.

METHODOLOGY

Study area

The study was conducted in Niger State, North-central Nigeria, between latitude 8◦ 20′ N and 11◦ 30′ N, and longitude 3◦ 30′ E and 7◦ 20′ E. being one of Nigeria's largest states, it accounts for around 8.6 million hectares (or 86,000 km^2), or 9.3% of the nation's total land area (Figure 1). Niger State borders the Federal Capital Territory (FCT) to the South East, the Republic of Benin to the West, Zamfara State to the North, Kebbi to the North-West and Kogi and Kwara states to the South and South West respectively. It is one of the largest states in Nigeria covering about 86,000km^2 (or about 8.6million hectares) representing about 9.3% of the total land area of the Country. The majority of the people in the state are farmers (85%) while the remaining15% are involved in other vocations such as white collar jobs, business, craft and arts. According to the 1990 Recourse Inventory Management (RIM) Survey, with an estimated 1.9 million cattle, 2.1 million sheep, 2.3 million goats, and over 6 million chickens, Niger state has one of the highest populations of livestock in Nigeria. (https://mlivestock.nigerstate.gov.ng). The Ministry of Livestock and Fisheries engaged veterinary and Para-veterinary professionals in pursuit of its mandate within the state. The Veterinary and Para-veterinary professionals in the state are distributed as shown in (Table 1).

Research design

The research design was essentially a mixed method survey design. It includes simple descriptive survey that assesses the KAP of animal health workers (Veterinary and Para Veterinary workers). The population of study included all public veterinary practitioners in Niger State (25) and Para-veterinarians in Niger State (108) making a total population 133. Using Taro Yamane (1967) formula, n = N/ 1+ N (e) 2, we arrived at 99 minimum effective respondents. The convenience sampling technique was used to proportionately select our respondents. The close-ended structured and pre-tested questionnaire was designed by adapting the NADIS reporting format, which was approved by ECTAD for disease reporting and surveillance in Nigeria (Masiga and Diop, 2007). The result was compared with qualitative in-depth interview result with the DVS, State Epidemiology officer and State Epidemiology Lead.

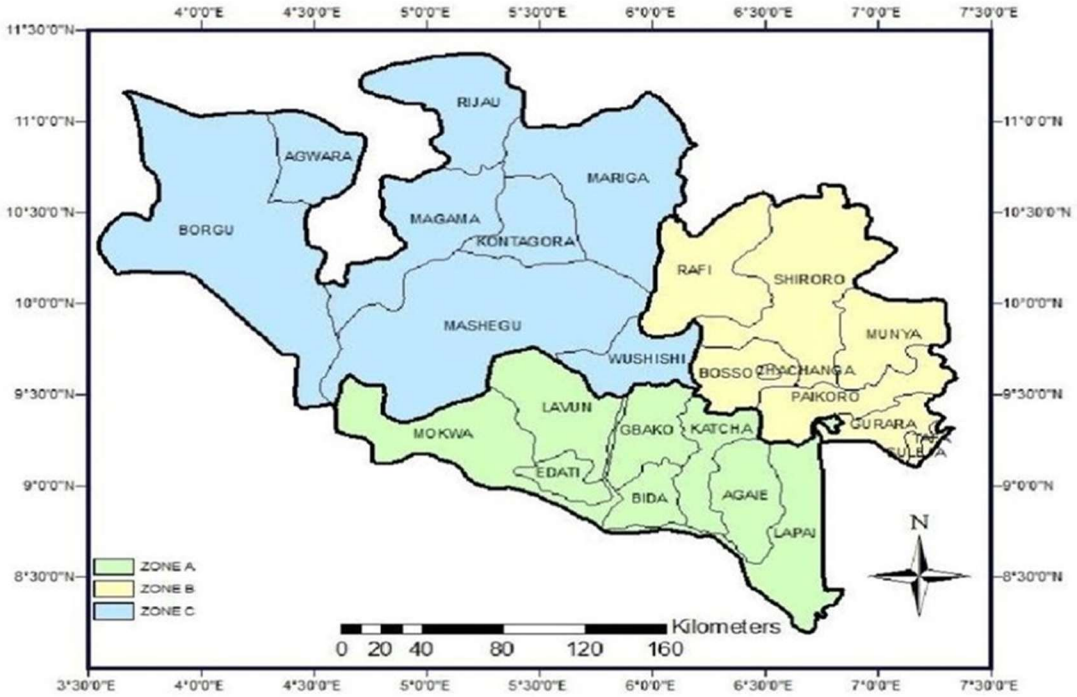


Figure 1: Map of showing the geographical location of study area, Niger State

Table 1: Veterinary officers, Animal Health and Husbandry Technologist in the Niger Civil Service (2022).

MDA/Department	Vet Officers	No. of AHHTs
MLF	SG - 1	Nil
Ministry of Youth	SG - 1	Nil
Animal Health	10	50
Animal Production	4	26
Vet Public Health and Epidemiology	6	12
Grazing Res. & Range Management	3	20
TOTAL	25	108

Source: The records were derived from the Ministry of Livestock and Fisheries, Niger State with the support of the DVS.ML&F, 2024.

Data analysis

The data obtained was entered into Microsoft Excel 7 (Microsoft Corporation, Redmond, WA, USA) spreadsheets. The responses variables were tabulated and results presented in frequencies, percentages, proportions and mean and range at 95% confidence level. Furthermore, tables and charts were used to illustrate the pattern of responses.

RESULTS

Socio-demographic distribution

A total of 120 questionnaires were administered and 100 were retrieved and analyzed. The gender distribution of respondents as shown on (Table 2) indicates 23% female and 77% male. The age distribution shows preponderance of respondents from the age bracket of 30 to 40 years old (47%). Those within the age bracket of 41 years and above constitute 43% of the respondents. The respondents within the age of 20 and 30 years are least in number (10%). Para-veterinarians constitute 82% of the respondents, while 18% are Veterinary doctors. This distribution mirrors the staffing pattern shown in (Table 1) and the reliance on para-professional animal health workers in surveillance documented elsewhere in Africa (Allport *et al*., 2005).

Knowledge of animal health workers in surveillance and disease reporting in Niger state

The Knowledge of animal health workers is shown on (Figure 2a-c). From the data majority of the respondents are not aware of the content of the MAR, DOD and SSR.

Table 2: Demographic distribution of respondents (N = 100).

Characteristic	Category	n (%)
Gender	Male	77 (77.0)
	Female	23 (23.0)
Age (years)	20–30	10 (10.0)
	31–40	47 (47.0)
	>40	43 (43.0)
Specialty	Veterinarians	18 (18.0)
	Para-veterinarians	82 (82.0)

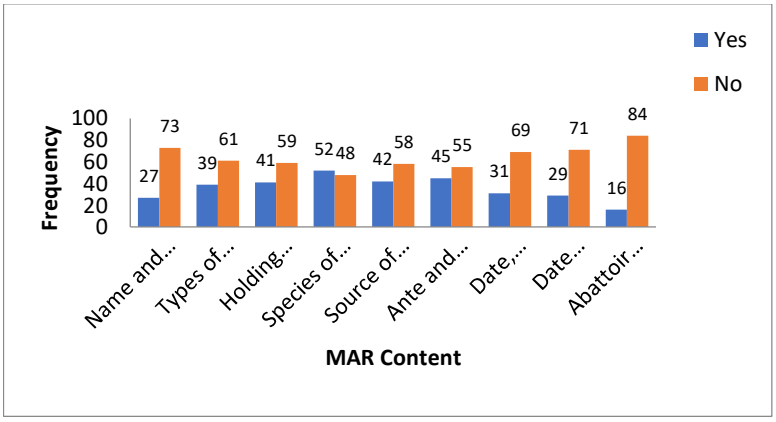


Figure2a: Animal health workers knowledge of MAR Content

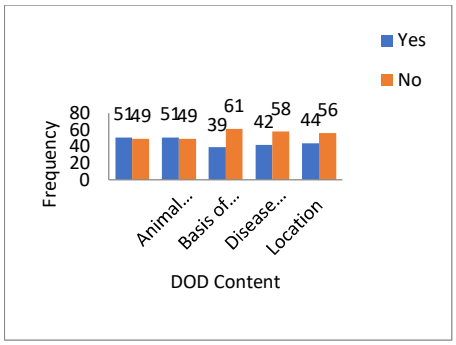


Figure 2b: AHW knowledge of DOD content

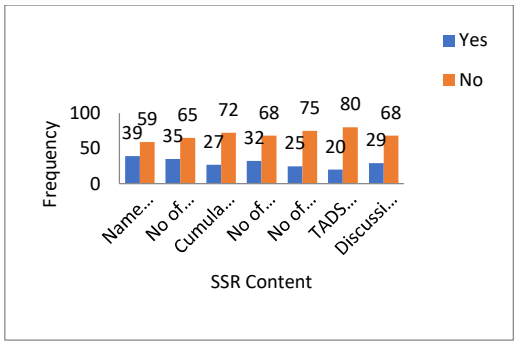


Figure 2c: AHW knowledge of SSR Content

However, there is variation in the level of appreciation in terms of the three forms. As shown by figure 2b, respondent have a better appreciation of the DOD form than the other two (MAR and SSR). On the content of the MAR, appreciable few respondents know that it contains report on Species of animals (52%), Source of animal (42%) and ante- and post-mortem inspection (45%). When disaggregated, the veterinarians have more knowledge of the content of the form than the Para-veterinarians. On the DOD, the only item that less than 40% of respondents know is the "basis of diagnosis". All other items are known by at least 40% and 61%. This shows some level of knowledge of the DOD. The materials or tool that is less known or understood by the respondents is the SSR. Most of the respondents have very poor knowledge about the Surveillance Summary report. Poor knowledge of reporting procedures among frontline workers has been reported in comparable KAP studies of animal and human health workers (Bawa *et al.*, 2003; Aniwada and Obionu, 2016; Nabirye *et al.*, 2017; Mligo *et al.*, 2022). Knowledge gaps among frontline health workers in north-central Nigeria have also been described for emerging zoonotic diseases (Ghali-Mohammed *et al.*, 2025). Generally, when we considered the cumulative mean value for the three reporting tools, there was poor knowledge about the content of SDR reporting tools by animal health workers in Niger state. As shown on (Table 3), the cumulative mean value of those who have knowledge of the SDR tools is 36.9, while those who don't have knowledge is 62.8. Individual mean evaluation of the knowledge gap was not different from the cumulative mean average, which stood at ratio of 36:64; 45:55; and 30:70 of those who know and those who don't know the MAR, DOD, and SSR respectively. This clearly demonstrates Knowledge gap among animal health workers, especially, Para-veterinarians.

Table 3: Mean Distribution of the Knowledge of SDR in Niger State.

Knowledge	YES	NO
MAR	35.77778	64.22222
DOD	45.4	54.6
SSR	29.57143	69.57143
Mean Average	36.9164	62.79788

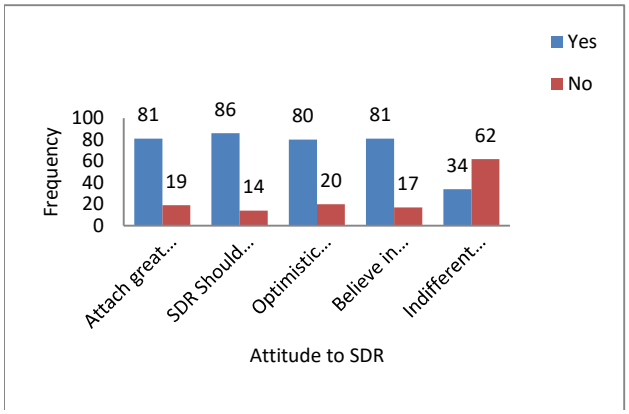


Figure 3: Attitude of AHW to SDR

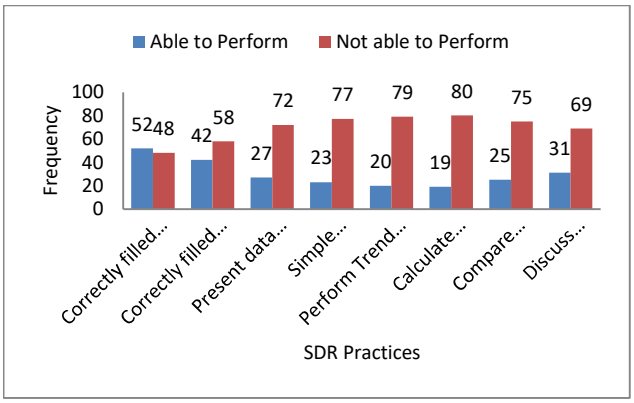


Figure 4: Practices of AHW to SDR

Attitudes of Animal Health Workers to Surveillance and Disease Reporting in Niger State

The data on the attitude of animal health workers towards surveillance and disease reporting was presented in (Figure 3). The data shows that 81% of respondents attached great importance to SDR as well as believe SDR will achieve the desire results in Niger state. Whereas 86% believe that SDR should be encouraged, 80% are optimistic about SDR in Niger state and 62% were not indifferent to SDR. However, it should be noted that higher percentage (34%) of the respondent are indifferent to SDR. This is consistent with the general absence of materials and tools to aid SDR. It is important to note that the positive attitude cut across specialty. Indifference to reporting in the presence of limited materials and logistic support is consistent with earlier reports from Nigeria (Bolajoko *et al.*, 2009; Dairo *et al.*, 2010). A mismatch between positive attitude and weak knowledge or practice is also a familiar pattern in studies of voluntary reporting, where reporting behaviour is shaped by social, cultural and practical factors as well as by attitude (Enticott *et al.*, 2022).

Practices of animal health workers towards surveillance and disease reporting in Niger state.

Figure 4 captures respondent's opinion on the practice of animal health workers in Niger state towards SDR. From the data generated, majority of respondents that said they were not able to summarize and present data in tables and figure are 72%, those who are not able to perform simple descriptive analysis (77%), those who cannot perform trend analysis (79%), those who cannot calculate

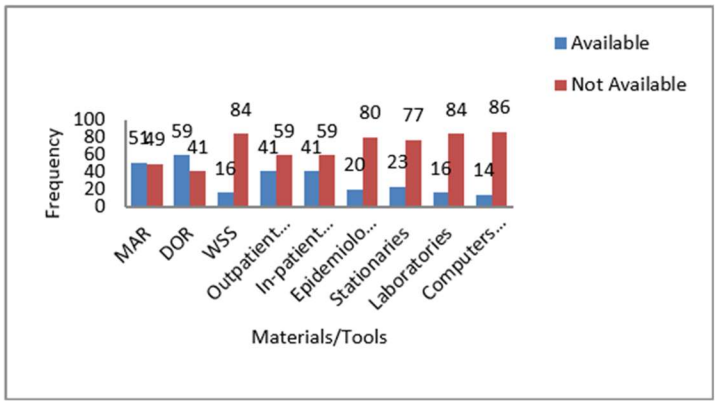


Figure 5: Materials/Tools for Surveillance and Disease Reporting

incidence and prevalence of disease (80%), those who cannot compare present and previous data (75%), and those who cannot discuss findings and make recommendations are 69%. The importance of this data is that even among the veterinarians, some are not able to perform these important tasks of surveillance and disease reporting practice. Weak reporting practices have similarly been documented among health workers in Nigeria (Iwu *et al.*, 2016; Makinde and Odimegwu, 2020), and the influence of training on the reporting of notifiable diseases has been examined in Yobe State (Bawa and Olumide, 2005). Limited analytical skills also reduce the ability of a surveillance system to generate data of sufficient quality and timeliness to support action (Groseclose and Buckeridge, 2017).

Availability of materials/tools that aids surveillance and disease reporting in Niger state

To achieve effective surveillance and disease reporting certain materials and tools are required. From the data collected (Figure 5), although Monthly Abattoir reporting (MAR) forms and Disease Outbreak Details (DOD) reporting forms are available in majority of the facilities covered (51% and 59% respectively), they hardly cover 50% of the respondent's facilities/centers. The percentage of respondents (49% and 41% respectively) that believe the MAR form and the DOD forms are not available are quite significant. Surveillance Summary Report (SSR) is largely not available (84%). There is equally a serious challenge of record keeping in most of the facilities as majority (59%) of respondent believes there are no out-patient and inpatient register in the clinics. It appears clinics and abattoir/slabs around urban centers like Minna, Suleja and Bida are largely, the respondents who filled in availability claim. Surprisingly, majority (80%) of the animal health workers claimed there is no Epidemiology Officer in Niger State. Majority of respondents believe that there are no Stationeries (77%), Laboratories (84%), Computers and internet (86%) in the facilities they work. Shortages of reporting forms, registers and communication equipment are recognized barriers to disease reporting (Bolajoko *et al.*, 2009; Dairo *et al.*, 2010; Division of Scientific Education and Professional Development, 2012), whereas simple mobile phone-based tools have improved surveillance reporting in resource-limited settings (Mtema *et al.*, 2016). The absence of an Epidemiology Officer, laboratories and computing facilities in most facilities limits the performance that surveillance systems can attain (Hoinville *et al.*, 2013).

DISCUSSION

In this study we found that there very few Veterinary doctors compare to Para-veterinarians. Consequently, not all facilities and clinics are manned by Veterinary officers. Considering the pivotal role of Veterinary officers in surveillance and disease reporting, coupled with the vast landmass of Niger state, as well as the likely 15% on the verge of retirement, the numbers of Veterinary officers are quite inadequate for effective surveillance and disease reporting. Para-professional and community-based animal health workers can strengthen disease surveillance (Allport *et al.*, 2005), but this depends on adequate training, supervision and supply of tools, which this study found to be lacking. Given that a majority of emerging infectious disease events are animal-borne (Jones *et al.*, 2008), thin veterinary staffing in a large state such as Niger is a concern for early detection. To achieve effective surveillance and disease reporting certain materials and tools are required to achieve completeness and timeliness. From the data collected, we discovered that most of the materials and tools are not available at animal health clinics and facilities across the state. Based on interviews conducted, it was revealed that the ECTAD Forms are inadequately supplied to the state. As such, authority concerned has to make photocopies in order to achieve the spread currently recorded (Personal, 2022). The finding by Dairo *et al.*, (2010) that lack of Logistic support and surveillance forms specifically associated with reporting of outbreaks by the officers in half of the local governments surveyed in two states of South west Nigeria confirmed our finding. Comparable constraints affecting the efficiency of animal disease reporting have been described in Oyo State (Bolajoko *et al.*, 2009), and

inadequate logistics and feedback are recognized limitations of notifiable disease surveillance (Isere *et al.*, 2015; Division of Scientific Education and Professional Development, 2012). The use of low-cost mobile technology has been shown to strengthen reporting in resource-limited settings (Mtema *et al.*, 2016) and could be explored in Niger State. The separation of animal and human disease information systems in Nigeria (Okoli, 2021) further limits information sharing and feedback to reporters.

The study also found the knowledge of Animal Health Worker (AHW) regarding the content of the different reporting tools, such as, the Monthly Abattoir Reporting (MAR)form, the Disease Outbreak Details (DOD) form and the content of the Surveillance Summary Report (SSR) as generally poor. The finding of Nabirye, *et al.* (2017) that only 21.4% veterinary workers were knowledgeable about the reporting procedures for Brucellosis confirmed our finding. Specifically, the inability to know that 'basis of diagnosis' is part of the reporting protocol underscores the OIE (2015) report which emphasize the importance of surveillance agents reporting the basis of diagnosis. This may not be unrelated to the inadequate laboratories for case testing. This is consistent with the inadequate material/tools for SDR earlier identified. This finding aligned with previous finding of lack of knowledge of reporting requirements as factor militating against disease reporting in general (Masiga and Diop, 2007; Fasina *et al,* 2020; Mligo *et al*., 2022). Poor knowledge of notification procedures has likewise been reported among health workers in Nigeria (Bawa *et al.*, 2003; Aniwada and Obionu, 2016; Iwu *et al.*, 2016), and the influence of training on the reporting of notifiable diseases has been examined (Bawa and Olumide, 2005), which supports the training-based interventions recommended below. Recent work in north-central Nigeria similarly points to knowledge gaps among frontline workers and recommends strengthened surveillance and targeted training (Ghali-Mohammed *et al.*, 2025), while interprofessional One Health training has been proposed to build joint outbreak-response capacity (Shehu *et al.*, 2024) and could be adapted to include para-veterinarians. Because published evaluations of zoonoses surveillance systems are scarce (Vrbova *et al.*, 2010), locally generated KAP evidence such as this is particularly valuable.

The study further found a positive attitude towards surveillance and disease reporting. The implication of these data is that animal health workers would be inclined towards improved effective reporting if the materials/tools are available and personnel adequately incentivized. This study also confirms the finding of over 80% of veterinary workers had a positive attitude towards SDR (Nabirye *et. al.*, 2017). KAP surveys of other health professionals have likewise examined attitudes alongside knowledge and practice (Phalkey *et al.*, 2015; Belete *et al.*, 2022), indicating that favourable attitudes alone are not sufficient for effective surveillance without adequate knowledge, tools and incentives (Halliday *et al.*, 2012). Because reporting is a behaviour influenced by social and cultural factors (Enticott *et al.*, 2022), participatory approaches that engage animal keepers and community-based animal health workers may help translate positive attitudes into practice (Alders *et al.*, 2020). Furthermore, the study found the practices of animal health workers in surveillance and disease reporting in Niger state as generally weak. Our finding is confirmed by Nabirye, *et. al*. (2017) who finds only 7.1% animal health workers had good practices regarding SDR. This is affirmed by the mean value (69.8) of those respondents with weak practices. Interviews with key officials revealed that most of those who show strong skill/experiences are likely to be the Veterinary Officers. Para-Veterinarians constitute the bulk of those with weak practices. According to another interviewee, this explains why completeness and timeliness may not be achieved (Personal communication, September 9, 2022). Similar weaknesses in reporting practice have been observed among health workers in Nigeria (Iwu *et al.*, 2016; Makinde and Odimegwu, 2020), underscoring that surveillance performance depends on human and organisational factors that evaluation frameworks recommend assessing alongside technical attributes (Calba *et al.*, 2015). Weak analytical practice also lowers the quality and timeliness of the data available for action (Groseclose and Buckeridge, 2017).

Conclusion

Although numerous studies have identified poor knowledge coupled with negative attitude and bad practices in human disease surveillance, little analytic attention has been paid to animal health workers knowledge, attitude and practice in Niger state. Much of what is known is based on mere assumptions and perceptions. We address this issue by assessing the knowledge attitude and practice of animal health workers in Niger state. The findings of this study include; 1) there are inadequate materials/tools for SDR in the state; 2) there is poor knowledge of SDR reporting requirements; 3) there is positive attitude towards SDR goals among animal health workers and finally; 4) there is weak practices skills/experience among animal health workers in Niger state. It is the conclusion of this study that with positive attitude towards SDR, the future of SDR in Niger is bright. With increased and improved training and incentives the knowledge gap can be covered and skills improved.

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