



Prevalence of equine influenza virus and assessment of knowledge in volunteered grooms in Zaria, Kaduna State

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Abstract

Equine influenza is a highly contagious respiratory disease with potential risks for both horses and grooms. This study assessed serological evidence of exposure to equine influenza in grooms and evaluated their knowledge, attitudes, and practices (KAP) in Zaria, Kaduna State. Blood samples from 20 volunteer grooms were tested using the Hemagglutinin Inhibition (HI) test for H3 and H7 antibodies, while 100 close-ended questionnaires assessed KAP. All samples tested negative, indicating no serological evidence of exposure. While 82.47% recognized equine influenza as "horse flu," only 67.01% identified its transmission and symptoms. All participants used horses for the Durbar festival, 72.15% sourced horses from outside Zaria, and 94.05% conducted regular check-ups. Despite 100% adoption of protective measures, knowledge gaps persist, highlighting the need for targeted education to enhance awareness and preventive practices.

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Introduction

Equine influenza virus (EIV) is a highly contagious Type A influenza virus belonging to the Orthomyxoviridae family, Influenzavirus genus, primarily affecting equids (Laabassi, 2016). The virus is responsible for two-thirds of viral respiratory illnesses in horses, with morbidity rates ranging from 60% to 90% in naïve populations and case fatality rates between 1% and 20% (Virmani *et al.*, 2020). EIV outbreaks lead to significant economic losses due to

widespread infection, decreased performance, and trade restrictions (Olguin-Perglione & Barrandeguy, 2021). EIV is classified into two subtypes H7N7 (subtype 1) and H3N8 (subtype 2). Global outbreaks of H3N8 have been reported in Croatia, Italy, Russia, Egypt, Australia, China, Brazil, the UK, and Nigeria (Yurov & Alexeyenkova, 2020). Although natural EIV infection in humans has not been definitively established, serological studies suggest potential

zoonotic risk, historical concerns about zoonotic transmission date back to the 1889 human influenza pandemic, which followed an equine influenza outbreak, suggesting a possible cross-species event (Xie *et al.*, 2016). Cases of influenza-like illness (ILI) have been reported in Mongolian children after equine exposure (Madhwal *et al.*, 2020).

In Nigeria, poor quarantine regulations and unregulated horse importation have contributed to repeated EIV outbreaks, particularly with the introduction of H3N8 FC-1 strains (Shittu *et al.*, 2020). Given the occupational exposure risks faced by grooms and horse handlers, this study aimed to serologically detect EIV antibodies among volunteer grooms in Zaria, Kaduna State. Additionally, it sought to evaluate their knowledge, attitudes, and practices (KAP) regarding equine influenza, providing insights into occupational exposure risks.

Materials and Methods

Study location

Zaria, the second-largest city in Kaduna State, Nigeria, lies between latitude 10°55'0" S – 11°5'0" N and longitude 7°30'50" W – 7°50'0" E, covering 612 km² at 600 m above sea level (Koko *et al.*, 2020). Historically known for equestrian traditions, Zaria remains a hub for ceremonial equestrian activities, making it ideal for this study.

Ethical clearance

Approval was obtained from the Faculty of Veterinary Medicine, University of Abuja Ethics Committee on Animal Use (Ref: UAECAU/2024/014).

Study design

A cross-sectional study was conducted to investigate human immune response and assess knowledge, attitude, and practices (KAP) related to equine influenza. Twenty (20) grooms (aged 21–50 years) voluntarily provided blood samples, while 100 structured questionnaires were administered.

Sample collection and preparation

A phlebotomist collected 3–4 mL of blood from each groom using an 18-gauge needle. Samples were transferred into serum clot activators, allowed to clot, and decanted. The sera were stored at –20°C for analysis at the Centre for Biotechnology Research and Training, Ahmadu Bello University, Zaria.

Laboratory diagnosis – Hemagglutinin Inhibition (HI) test

HI test, following OIE (2018) guidelines, was conducted for the detection of H3 and H7 influenza

antibodies. Two-fold serial dilutions of sera were prepared in V-bottom microtiter plates, mixed with 4 HAU/50 µL of standardized influenza virus antigen, and incubated for 30 minutes at room temperature. A 1% RBC suspension was added, and hemagglutinin inhibition was assessed after 30–60 minutes. Titers <1:40 were considered negative.

Data collection and statistical analysis

KAP assessment was conducted at multiple horse stables using structured, closed-ended questionnaires. Interpreters facilitated responses where necessary. Data, including horse sourcing, stable management, and festival participation, were analysed using SPSS (version 20.0) with descriptive statistics (frequencies and percentages). A one-sample proportion test was used to determine if the observed proportion differed significantly from a hypothesized value, with $p < 0.05$ considered statistically significant.

Results and Discussion

Out of the 20 grooms' sera tested for the presence of equine influenza antibodies, none was positive for the targeted H3 and H7 subtypes using the hemagglutinin inhibition (HI) test. The knowledge, attitude, and practices (KAP) survey among grooms in Zaria (Table 1) revealed that 82.47% recognized equine influenza by its vernacular name "horse flu," while 67.01% had knowledge of its clinical signs and transmission. Only 25.77% had heard of previous equine influenza outbreaks, and 20.62% had observed clinical signs in their horses. Regarding attitude, 100% of the respondents participated in the Durbar festival with their horses, and 72.15% sourced horses from outside Zaria. In terms of practice, 94.85% conducted regular veterinary check-ups, while 100% cleaned and disinfected horse stables and used self-protective measures when handling horses. However, none of the grooms reported vaccinating their horses against equine influenza.

The absence of detectable antibodies against equine influenza virus (EIV) subtypes H3 and H7 in all 20 volunteers could be due to multiple factors. Equine influenza is mainly adapted to horses and has low zoonotic potential, typically requiring prolonged and high-risk exposure for human transmission, an exposure level that may not have been present among the grooms sampled in this study (Cullinane & Newton, 2013). Although experimental studies suggested that equine influenza could infect humans (Kasel & Couch, 1969), no recent evidence supports sustained zoonotic transmission except the study

Table 1: Equine influenza assessment responses amongst participatory grooms and horse handlers in Zaria

Variables	Categories	Knowledge			
		Responses Frequency (97)	Percentage (%)	P-value	95% CI
Do you know a disease called Equine Influenza?	Yes	30	30.93	<0.0001	-0.51 to -0.25
	No	67	69.07		
Are you familiar with disease called horse flu?	Yes	80	82.47	0.0843	0.54 to 0.76
	No	17	17.53		
Have you heard of the outbreak of horse flu in Zaria?	Yes	25	25.77	<0.0001	-0.61 to -0.36
	No	72	74.23		
Do you know the clinical signs of horse flu?	Yes	65	67.01	0.0116	0.21 to 0.47
	No	32	32.99		
Do you know how horse flu is transmitted?	Yes	65	67.01	0.0116	0.21 to 0.47
	No	32	32.99		
Have you ever observed signs of horse flu in your horses?	Yes	20	20.62	<0.0001	-0.61 to -0.36
	No	77	79.38		
Attitude					
Do you participate in durbar festival with your horses?	Yes	97	100	0.00	1 to 1
	No	-	-		
Do you source for horses outside of Zaria?	Yes	70	72.15	0.0061	0.32 to 0.59
	No	27	27.85		
Are your horses in separate compartment in your stable?	Yes	90	92.78	0.4772	0.78 to 0.93
	No	7	7.22		
Do you keep horses and donkeys together?	Yes	-	-	0.00	-1 to -1
	No	97	100		
Do you raise domestic birds within horse stables?	Yes	25	25.77	<0.0001	-0.61 to -0.36
	No	72	74.23		
Practices					
Do you conduct regular check-ups for your horses?	Yes	92	94.85	0.6116	0.82 to 0.95
	No	5	5.15		
Do you clean and disinfect horse stables regularly?	Yes	97	100	0.00	1 to 1
	No	-	-		
Have you ever vaccinated your horses for horse flu?	Yes	-	-	0.00	-1 to -1
	No	97	100		
Do you protect yourself against diseases when handling horses?	Yes	97	100	0.00	1 to 1
	No	-	-		

conducted by Larson *et al.* (2015). Additionally, serological detection depends on recent exposure and circulating antibodies, which wane over time in the absence of active infection (Paillot, 2014). The strong self-protective practices reported by all participating grooms may have further reduced exposure risk.

The KAP survey demonstrated a high level of awareness and preventive measures among grooms. Previous informal training from veterinary professionals and long-term exposure to equine management may have contributed to their knowledge and adherence to best practices (Baba *et al.*, 2022). Furthermore, Kaduna State, known for its vibrant Durbar festival, facilitates the movement of horses across regions, increasing the risk of equine

influenza transmission (Olufemi *et al.*, 2022). The sourcing of horses from outside Zaria, particularly from regions with potential equine influenza circulation, suggests a possible risk factor requiring further surveillance.

In conclusion, this study serves as a preliminary report on the serological detection of equine influenza and the KAP of grooms in Zaria. The findings indicate good knowledge and preventive practices among participants but emphasize the need for continuous surveillance and public health education to mitigate potential spillover risks. Further studies with larger sample sizes are recommended to validate these findings and assess broader occupational exposure risks.

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Conflict of Interest

The authors declare that there is no conflict of interest.

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