

بِسْمِ اللّٰهِ الرَّحْمٰنِ الرَّحِیْمِ

(لَا يَكْفُرُ اللّٰهُ نَفْسًا إِلَّا وُسْعَهَا لَهَا مَا

كَسَبَتْ وَعَلَيْهَا مَا اكْتَسَبَتْ رَبَّنَا لَا

تُؤَاخِذْنَا إِن نَّسِينَا أَوْ أَخْطَأْنَا رَبَّنَا

وَلَا تَحْمِلْ عَلَيْنَا إِيْرًا كَمَا حَمَلْتَهُ عَلَى

الَّذِينَ مِنْ قَبْلِنَا رَبَّنَا وَلَا تَحْمِلْنَا مَا لَا

طَاقَةَ لَنَا بِهِ وَاعْفُ عَنَّا وَارْحَمْنَا

وَارْحَمْنَا أَنْتَ مَوْلَانَا فَانصُرْنَا عَلَى

الْقَوْمِ الْكَافِرِينَ)

صدق الله العظيم

سورة البقرة الآية (286)

**DEDICATION**

**THIS THESIS IS DEDICATED  
TO MY FATHER'S SOUL,  
TO MY MOTHER KOSHY DALDOM,  
TO MY FAMILY, TO MY SISTERS, BROTHERS, NEPHEWS  
COLLEAGUES AND FRIENDS WHOSE ENCOURAGEMENTS  
HAVE MEANT TO ME SO MUCH DURING THE PURSUIT OF MY  
GRADUATE DEGREE  
WITH GREAT LOVE AND RESPECT**

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## LIST OF ACRONYMS

Ag                      antigen

BHK- 21	Baby hamster kidney-cell line
CI	Confidence Interval
CFT	Complement fixation test
CPE	Cytopathic effect
Cob	confirmation of outbreaks
ELISA	Enzyme linked immunosorbent assay
EMPRES	The Emergency Prevention System for Transboundary Animal Diseases and Plant Pest and Diseases
FAO	Food and Agricultural Organisation
FMD	Foot-and-mouth disease
FMDV	Foot-and-mouth disease virus
GMEM:	Glasgow Minimum Essential Medium
IRES	Internal Ribosome Entry Site
LFA	Lateral-flow assay
LPB ELISA	Liquid phase blocking
LQCD	Lab quarantin center-Dammerjog
MARFR	Ministry of Animal Resources, Fisheries and Rangelands
MAbs	Monoclonal
µL	Microlitre
mPCR	Multiplex Polymerase Chain Reaction
Mve	monitoring vaccine efficacy
nm	Nanometer
NSPs	nonstructural proteins
OD	Optical density
OIE	Office international des epizooties (The World Organization for Animal Health)
Op	oesophageal-pharyngea
OR	Odds ratio
PAbs	Polyclonal antibodies
PCR	Polymerase Chain Reaction
PCPFMD	Progressive Control Pathway for FMD
RGD	Arginine-Glycine-Aspartic acid
Res	research
RT-PCR	Reverse transcription PCR
SES	Somali Ecosystem
SS	Single stranded
SP	structural proteins
SPBE	solid phase blocking ELISA
SPCE	solid phase competition ELISA
SPSS	Statistical package for the Social Sciences
UK	The United Kingdom
US	The United States of America
UTR	Un translated region
VI	virus isolation
VNT	Virus neutralization test
Vmat	vaccine matching
VPg	Viral genome protein
v/v	Volume in volume
-ve	Negative

+ve	Positive
WRLFMD	World Reference Laboratory for FMD
w/v	Weight in volume
$\chi^2$	Chi square

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## ABSTRACT

This study is a cross-sectional study, carried out in Khartoum State, Sudan during the period from the 9th of April to 22<sup>nd</sup> of May 2014 with the objectives to determine the sero-prevalence of Foot and Mouth Disease (FMD) sero-type A and to identify the potential risk factors associated with the disease in cattle. A total of 85 serum samples were collected from cattle from six localities of Khartoum State and were examined at the Veterinary Research Institute Soba, Khartoum, using the Virus Neutralization test (VNT). Results of the present study showed that the overall sero-prevalence of FMD Serotype A in Khartoum State was (68.8%). Thirty two risk factors were investigated to determine the association between them and the occurrence of FMD. In the univariate analysis using the Chi square ( $\chi^2$ ) test the following risk factors: locality, age, breed, herd size, artificial insemination, test of new animals before placement in the herd and manure disposal were found significantly associated (P-value  $\leq 0.30$ ) with FMD sero-positivity. In the multivariate analysis using the logistic Regression, only age was found significantly associated (P-value  $\leq 0.05$ ) with FMD sero-positivity. It was concluded from the results that the sero-prevalence of FMD in cattle in Khartoum State is of concern in the area, therefore effective control measures should be implemented to limit the effect of the disease.

## ملخص البحث

هذه الدراسة هي دراسة عبر القطاعية (cross sectional)، أجريت في ولاية الخرطوم بالسودان خلال الفترة من 9 أبريل إلى 22 مايو 2014 الهدف منها تحديد معدل انتشار أضرار مرض الحمى القلاعية من النوع (أ) و التعرف على عوامل الخطر المحتملة المرتبطة بهذا المرض في الأبقار. وقد تم جمع 85 عينة مصل من الأبقار من ستة محليات في ولاية الخرطوم و تم فحصها في معهد البحوث البيطرية وذلك باستخدام اختبار فيروس تحييد (VNT). وأظهرت نتائج الدراسة الحالية أن معدل انتشار أضرار مرض الحمى القلاعية العام من النوع (أ) في ولاية الخرطوم بلغت (68.8%). اثنان وثلاثون عامل خطر تم التحقق منه لتحديد الارتباط بينها وبين حدوث مرض الحمى القلاعية. في التحليل باستخدام مربع كاي ( $\chi^2$ ) قد لوحظ إحصائياً أن عوامل الخطر التالية: المحليات، العمر، السلالات، حجم القطيع، التلقيح الاصطناعي، اختبار الحيوان الجديد قبل إدخاله للقطيع و التخلص من السماد تترافق إحصائياً (القيمة المعنوية) ( $P\text{-value} \leq 0.30$ ) مع معدل انتشار أضرار مرض الحمى القلاعية.

أما في التحليل متعدد المتغيرات فقط العمر هو عامل الخطر المترافق إحصائياً (القيمة المعنوية  $P\text{-value} \leq 0.05$ ) مع معدل انتشار أضرار مرض الحمى القلاعية. نستنتج من النتائج أن معدل انتشار أضرار مرض الحمى القلاعية في الماشية في ولاية الخرطوم يشكل مصدر قلق في المنطقة، و ينبغي أن تعتمد تدابير مكافحة الفعالة للحد من أثر هذا المرض.