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DEDICATION

*THIS WORK IS DEDICATED TO THE
SOULS OF MY PARENTS, WHO
BELIEVED IN THE IMPORTANCE OF
EDUCATION. IT IS ALSO DEDICATED
TO MY HUSBAND, BROTHERS, SISTERS
AND FRIENDS, WITH WARM WIDE
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LIST OF ACRONYMS

aa	Amino Acid
Abs	Antibodies
Ag	Antigen
AGID	Agar Gel Immunodiffusion
AGPT	Agar Gel Precipitation Test
APS	Animal Production System
ATCC # CCL81	American Type Cell Culture
BB	Blocking Buffer
BDSL	Biological Diagnostic Supplies Limited
BHK-21	Baby Hamster Kidney
bp	Base pair
BPS	Buffered Physiological Saline
CBS	Central Bank of Sudan
CCFR	Crude Case Fatality Rate
CCPP	Contagious Caprine Pleuro-Pneumonia
cDNA	Complementary Deoxyribonucleic Acid
CDV	Canine Distemper Virus
cELISA	Competitive Enzyme Linked Immuno-Sorbent Assay
CFT	Complement Fixation Test
CIEP	Counter immunoelectrophoresis
CIRAD	Centre de Coopération Internationale en Recherché Agronomique pour le Développement
CIRAD	The International Cooperation Centre in Agronomic Research for Development
CPE	Cytopathic Effect
DAAD	Deutscher Akademischer Austausch Dienst
DAAD	The German Academic Exchange Service
DAH & ED	Directorate of Animal Health and Epizootic Diseases Control
DDW	De-ionized Distilled Water
DIVA	Differentiation of Infected from Vaccinated Animals

DNA	Deoxyribonucleic Acid
dNTPs	Deoxonucleoside triphosphate
EDI	ELISA Data Interchanges Software
EduLink	The Connecting Learning Communities
F	The Fusion Gene
FAO	Food and Agriculture Organization of the United Nations
FEE	Foreign Exchange Earnings
GDP	Gross Domestic Product
GHA	The Greater Horn of Africa
GIS	Geographical Information System
GIT	The Gastrointestinal Tract
GREP	Global Rinderpest Eradication Project
H	The Haemagglutinin Gene
H ₂ O ₂	Hydrogen Peroxide
HA	Hemagglutination Test
HRPO	Horseradish Peroxidase Conjugate
IcELISA	Immunocapture Enzyme Linked Immuno-Sorbent Assay
IGAD	Intergovernmental Authority on Development
ILRI	International Livestock Research Institute
M	The Matrix Gene
MAb	Monoclonal Antibody
MAR	Mean Average Rainfall
MARF	Ministry of Animal Resources and Fisheries
MDBK	Madin-Darby Bovine Kidney Cells
MDT	Mean Daily Temperatures
MEPD	Ministry of Environment and Physical Development
mRNA	Messenger Ribonucleic Acid
MT	Metric Tones
MTADM	Master Program in Transboundary Animal Disease Management
MV	Measles Virus of Humans
N	The Nucleocapsid Gene

NES	Nuclear Export Signal
NLS	Nuclear Localization Signal
No.	Number
NP	Nucleoprotein
NPV	Net Present Value
NS	Normal saline
nt	Nucleotide
°C	Degree Centigrade
OD	Optical Density
OIE	The International Organization for Animal Health
OPD	Ortho-Phenylenediamine
Orf	Contagious Ecthyma
ORF	Open Reading Frame
PAGE	Electrophoretic Profile in Polyacrylamide Gel
PANVAC	The Pan African Veterinary Vaccine Centre
PARC	The Pan-African Rinderpest Campaign
PBMC	Peripheral Blood Mononuclear Cell
PBS	Phosphate Buffered Saline
PCR	Polymerase Chain Reaction
PCV	Packed Cell Volume
PD	Phosphate diluents
pH	Measure of the Acidity or Basicity
PI	Percentage of Inhibition
PPR	Peste Des Petits Ruminants
PPRV	Peste Des Petits Ruminants Virus
RBCs	Red Blood Cells
RBOK	The Kabete 0 Strain of Rinderpest
RNA	Ribo-nucleic Acid
RNP	Ribonucleo-Protein
RPV	Rinderpest Virus
RT	Reverse Transcriptase Enzyme

RT-PCR	Reverse Transcription Polymerase Chain Reaction
Shoats	Sheep and Goats
SP	Strong Positive
SPS	Sanitary and Phyto-Sanitary
SPSS	The Statistical Package for Social Sciences for Windows®
SVRI	Soba Veterinary Research Institute
T cells CD4+	T helper Lymphocytes
T cells CD8+	Cytotoxic T Lymphocytes
Taq	Thermostable DNA Polymerase
TCID	Tissue Culture Infective Dose
TCID ₅₀	50% Tissue Culture Infective Dose
TCRV	The Tissue Culture Rinderpest Vaccine
UN	The United Nations
US\$	United States Dollar
USAID	United States Agency for International Development
Vero	African Green Monkey Kidney Cell
VNT	Virus Neutralization Test
WP	Weak Positive
μl	Microliter

ABSTRACT:

The results of this study have increased knowledge on the epidemiology of PPR in sheep in River Nile and White Nile States of the Sudan, by using cELISA testing and a questionnaire survey. The estimated overall sero-prevalence rate was found to be 53% (275/519). There were differences in the sero-prevalence rates between different surveyed localities: Shendi and Almatama localities showed a significantly higher sero-prevalence rate than the other 3 localities in River Nile State. In White Nile state Alsalam locality showed the higher sero-prevalence rates while Rabak, Elgableen and Algetena showed a lower rate. There were differences in the sero-prevalence rates estimated among different breeds: Garrage showed lower sero-prevalence rates 49.2% (123/250) than the other breeds. On the other hand, Baladi breed showed the highest prevalence rate of 56.5% (147/260), with 95% CI between 50.47% and 62.53%, while Hamari breed showed sero-prevalence rate of 55.6% (108/174), with a 95% CI between 23.14 and 88.06. There were no statistically significant differences in the sero-prevalence rates among different age groups. For sexes, females were showing a higher sero-prevalence rate than males. Significant risk factors associated with a cELISA positive status for PPRV in the univariate analysis using the chi-square test were found to be locality, sex, age, herd composition, cleaning, migratory routes, season, morbidity rate, mortality rate, abortion rate, affecting production, loss during year, using outside rams and vaccination ($p\text{-value} \leq 0.05$). State, herd size, breed, signs in herd, cleaning after abortion, udder cleaning and veterinary service, were not identified as significant risk factors. The only factors found to be significantly associated with increased odds of being cELISA positive in the multivariate analysis was sex (females).

From the economic analysis it found that disease caused big loss due to PPR and there was significant association between abortions, death, cost of abortion and cost of death and PPR infection in the two states.

Investigation results suggest that PPR has taken an endemic pattern of occurrence in the Sudan as reported from other countries in East Africa. Urgent need therefore exists to initiate a realistic network for surveillance, control and eradication of this important disease in the Sudan and in the region. Such scheme is suggested and supported at high levels and it should immediately be launched as recommended by OIE.

المستخلص

هدفت هذه الدراسة الى معرفة بائية ورض طاهون المجزات الصغيرة في الأغنام في نهر النيل والنيل الأبيض بالوهران، وذلك باستخدام اختبار **cELISA** والاستبيان. تم العثور على معدل انتشار مصلى بما يقارب 53% (275/519). هناك فوق في معدلات الانتشار المصلى بين مختلف المحليات التي شملها الاستطلاع في ولاية نهر النيل محليتي: شندي والمتمة اظهوا أعلى معدل انتشار مصلى بشكل ملحوظ عن 3 محليات أخرى ولاية نهر النيل. في ولاية النيل الأبيض محلية السلام اظهوت أعلى معدل انتشار مصلى بينما محليات تر بك، القطينة و الجبلين اظهوت أقل معدل من محلية السلام. هناك فترات مقوية في مقدار معدلات الانتشار المصلى بين السلالات المختلفة: القوج اظهر أقل معدل انتشار مصلى 49.2% (123/250) من السلالات الأخرى. من ناحية أخرى اظهوت سلالة البلدي أعلى معدل انتشار 56.5% (147/260)، مع 95% CI بين 23،14 و 62،53 50،47% سلالة الحوي اظهوت معدل انتشار 55.6% (108/174)، مع 95% CI بين 23،14 و 88،06 و لم تكن هناك فوق ذات دلالة إحصائية في معدل الانتشار المصلى بين الفئات العرقية المتباينة للجنسين، حيث تظهر الإناث أعلى معدل انتشار مصلى من الذكور. تم العثور على عوامل خطر كبيرة وتبطة بالحالة الإيجابية لـ **cELISA PPRV**. في التحليل وحيد المتغير باستخدام اختبار وبع كاي ليون المكان والجنس، والعمر، وتكوين القطيع، والتنظيف، طرق الحوكمة، الوسم، معدل الإراض، معدل لإفيات، معدل

الإجهاض، مما يؤثر على الإنتاج، وفقدان خلال العام، وذلك باستخدام ($P \geq 0.05$). الولاية، حجم القطيع، السلالة، العلامات المميزة للمرض، التنظيف، التنظيف بعد الإجهاض، تنظيف الضرع، والخدمات البيطرية لم يتم تحديدها كوامل خطره. كان العوامل الوحيدة الذي يكون مرتبط بشكل كبير مع زيادة المرض في التحليل متعدد المتغيرات هو الجنس (إناث)، في حين أن كل العوامل الأخرى وجدت لا ترتبط بشكل كبير مع زيادة الاحتمالات بانها إيجابية. وأظهرت نتائج الاستبيان أن حوكمة الحوانات، وممارسة الوعي تؤثر على انتشار المرض. من التحليل الاقتصادي وجد أن المرض تسبب في خسائر كبيرة بسبب مرض طاهون المجزات الصغيرة ووجد أن هناك ارتباط مهم بين الإجهاض، والموت، تكلفة الإجهاض و تكلفة النفوق في الولاياتين. نتائج التحقيق تشير إلى أن مرض طاهون المجزات الصغيرة صلا مسوئلاً في الوردان كماورد من دول أخرى في شرق أفريقيا. لذلك هناك حاجة ملحة للثروع في شبكة قائية للسيطرة والمراقبة والقضاء على هذا المرض في الوردان وفي المنطقة وكذلك تقترح الواسة الدعم من مسوئيات عليا، ينبغي أن تتطلق وامج المكافحة على الفور على النحو الموصى به من قبل المنظمة العالمية لصحة الحوان (OIE).

