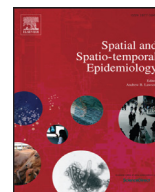




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journal homepage: www.elsevier.com/locate/sste

Original Research

Time series analysis and mortality model of dog bite victims presented for treatment at a referral clinic for rabies exposure in Monrovia, Liberia, 2010–2013



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ARTICLE INFO

Article history:

Received 2 November 2016

Revised 24 March 2017

Accepted 7 April 2017

Available online 25 May 2017

Keywords:

Dog bite

Forecast

Rabies

Treatment outcome

ABSTRACT

We developed time trend model, determined treatment outcome and estimated annual human deaths among dog bite victims (DBVs) from 2010 to 2013 in Monrovia, Liberia. Data obtained from clinic records included victim's age, gender and site of bite marks, site name of residence of rabies-exposed patients, promptness of care sought, initial treatment and post-exposure-prophylaxis (PEP) compliance. We computed DBV time-trend plot, seasonal index and year 2014 case forecast. Associated annual human death (AHD) was estimated using a standardized decision tree model. Of the 775 DBVs enlisted, care seeking time was within 24 h of injury in 328 (42.32%) DBVs. Victim's residential location, site of bite mark, and time dependent variables were significantly associated with treatment outcome ($p < 0.05$). The equation $\hat{X}_t = 28.278 - 0.365t$ models the trend of DBVs. The high ($n = 705$, 90.97%) defaulted PEP and average 155 AHD from rabies implied urgent need for policy formulation on national programme for rabies prevention in Liberia.

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1. Introduction

Dog bite injury and human death emanating from suspected rabid dogs are well-known public health challenges

in developing countries of Africa (Abubakar and Bakari, 2012; Aghahowa and Ogbevoen, 2010; Ahmed et al., 2000; Cleaveland et al., 2007; Fevre et al., 2005; Hampson et al., 2007; Olugasa et al., 2009; Jomah et al., 2013; Traoré et al., 2013; Knobel et al., 2005). As such, timely and effective completion of post-exposure-prophylaxis (PEP) is top priority in the prevention of rabies following the bite of a suspected rabid dog (Abubakar and Bakari, 2012; Ahmed et al., 2000; Cleaveland et al., 2007; Fevre et al., 2005). More than 55,000 human deaths occur each year due to

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Fig. 1. Map of Montserrado County, with the location of Monrovia city in the south-western coast of Liberia.

rabies, worldwide, and the majority of these incidents take place in the developing countries, especially in Africa and Asia (Knobel et al., 2005). Liberia is profoundly vulnerable to poor rabies treatment outcomes among human patients, a situation that is attributable to the care seeking behavior of the populace after the prolonged civil war, 1989–2003 (Kruk et al., 2010, 2011) in the country. The civil crisis led to severe economic and infrastructural setbacks, persistent deficit in skilled manpower and a remarkable decline in the quality of national health care and veterinary services (Kruk et al., 2010, 2011). Compliance with PEP and out-

comes of treatments received by dog bite victims (DBVs) has not been reported for Monrovia, the largest and capital city of Liberia. The devastating outbreak of Ebola virus disease in 2014–2015 (Dixon and Schafer, 2014; World Health Organization, 2014) also placed a huge demand upon the already weakened public health system; further marginalizing rabies surveillance, prevention and control.

At the Pan-African Rabies Control Network (PARACON) meeting held at Gauteng, South Africa, 9th–11th June 2015, the FAO/WHO announced a programme of rabies elimination that will be enacted in all African countries by year

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