



Epidemiological measures of peste des petits ruminants in small ruminants in Tamil Nadu, India

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Abstract

An epidemiological study was undertaken to assess the crude and specific measures of morbidity, mortality and case fatality against Peste des petits ruminants (PPR) in small ruminants. A total of 18 PPR outbreaks were selected by active and passive surveillances in North-west agroclimatic zone of Tamil Nadu, India. Overall morbidity, mortality and case fatality rates were 3.18%, 1.09% and 34.28% respectively which is lower than the earlier reports. Morbidity and mortality rates were higher in goats in comparison with sheep indicating that goats are more susceptible to infection. Morbidity, mortality and case fatality rates were higher in young animals than adults for both species. Infection and severity of the disease were more in non-descript and Mecheri breeds of sheep and Tellicherry and Jamunapari breeds of goats. Infection rate and severity of the disease were more in males and females of both species respectively. The present study concludes that species, age, breed and gender predisposing exist in the outbreaks of PPR.

Keywords: Peste des petits ruminants; epidemiological measures; small ruminants; active and passive surveillances

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Introduction

Peste des petits ruminants (PPR) is an acute febrile viral disease of sheep and goats, clinically characterized by high fever, anorexia, mucopurulent nasal discharge, conjunctivitis and encrustation in the medial canthus, ulcerative stomatitis, profuse diarrhoea and broncho-pneumonia (Abd El-Rahim et al., 2010). It is caused by Peste des petits ruminants virus (PPRV), a ribonucleic acid virus belonging to the genus *Morbillivirus* and family *Paramyxoviridae* (Gibbs et al., 1979). The transmission of virus requires close contact between susceptible and infected animals in the febrile stage (Braide, 1981). The disease severity is influenced by several factors including PPRV lineage, animal species, breed, immune status etc. (Karimuribo et al., 2011). In India, the disease was first reported in 1987 in a small sheep flock in the village of Arasur in Tamil Nadu state (Shaila et al., 1989), subsequently outbreaks occur as a

regular feature in different parts of country since 1994 (Purushothaman et al., 2006) and it now endemic (Balamurugan et al., 2012). The PPR causes morbidity and mortality as high as 100% and 90%, respectively (Abubakar et al., 2011) and now it is considered to be the most serious disease threat to the small ruminant industry (Hegde et al., 2009). Due to its high mortality and morbidity rates, PPR has been rated as a notifiable viral disease by OIE. The total losses due to the disease have been found to range between Indian Rupees 918 in sheep to Indian Rupees 945 in goats because of the reduction in production, abortion, market value and wool/hair quality (Thombare and Sinha, 2009). Economic losses due to PPRV at national level have been estimated to be 1,800 million Indian Rupees (US\$ 39 million) annually (Bandyopadhyay, 2002). In the present study, efforts have been made to assess the crude and specific rates of morbidity, mortality and case fatality in Indian sheep and goats.

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Materials and Methods

A total of 18 PPR outbreaks were identified by active and passive surveillances in North-west agroclimatic zone of Tamil Nadu, India. Out of 18 PPR outbreaks, 4 and 14 outbreaks were observed in sheep and goats respectively. Crude and specific rates of morbidity, mortality and case fatality were calculated as per the method followed by Gorsi et al. (2011).

Results and Discussion

Crude measure

Crude measures are an expression of the amount of disease and death in a population as a whole; they take no account of the structure of the population affected (Thrusfield, 2005). Out of 12217 animals under the risk, 388 and 133 were affected and died, respectively. Overall morbidity, mortality and case fatality rates were 3.18%, 1.09% and 34.28%, respectively. Observed rates were lower when compared to earlier report of Abd El-Rahim et al. (2010) who observed morbidity, mortality and case fatality rates 26.10%, 10.5% and 40.2%, respectively. Variation in the rates might be due to geographic location, breed, husbandry practice and level of flock immunity as reported by Diallo (2006) and Karimuribo et al. (2011).

Specific measures

Specific measures of disease are those that describe disease occurrence in specific categories of the population related to host attributes such as age, sex, breed and method of husbandry, etc. These measures more information than crude measures on the pattern of disease and categories of animal that are particularly at risk of disease (Thrusfield, 2005).

a) Species specific measure

Morbidity, mortality and case fatality rates were 2%, 0.70% and 34.78% in sheep and 4.21%, 1.44% and 34.07% in goats, respectively (Fig. 1). Morbidity and mortality rates were higher in goats in comparison with sheep; indicating that goats are more susceptible to infection than sheep. This result is in agreement with Abd El-Rahim et al. (2010) and Mahajan et al. (2013) who found that goats were more susceptible to PPRV infection than sheep.

b) Age specific measure

Morbidity, mortality and case fatality rates were 10.99%, 4.97% and 45.24% in young sheep and 1.36%, 0.39% and 28.77% in adult sheep, respectively. Morbidity, mortality and case fatality rates were 17.39%, 6.35% and 36.54%, respectively in young goats and 2.87%, 0.94% and 32.54% in adult goats respectively (Fig. 2). Infection and severity of the disease were more 0.39% and 28.77% in adult sheep, respectively. Morbidity,

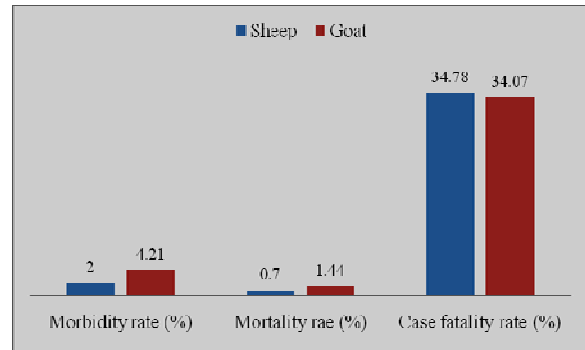


Fig. 1: Species specific measure of peste des petits ruminants in small ruminants

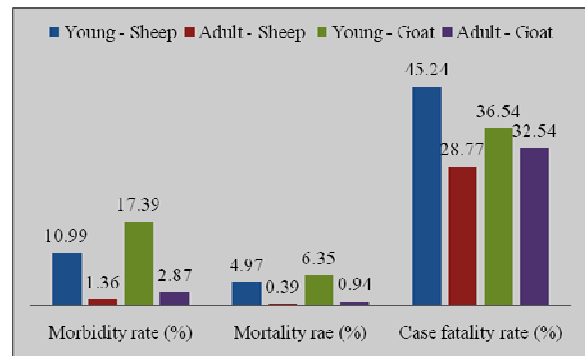


Fig. 2: Age specific measure of peste des petits ruminants in small ruminants

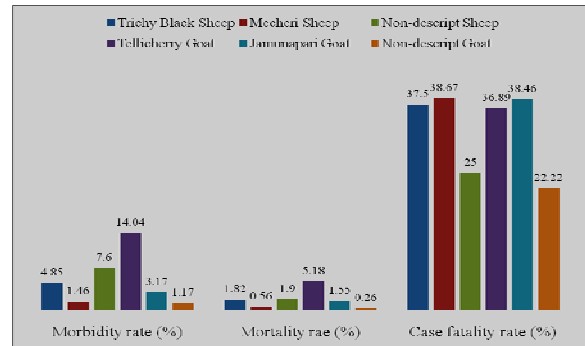


Fig. 3: Breed specific measure of peste des petits ruminants in small ruminants

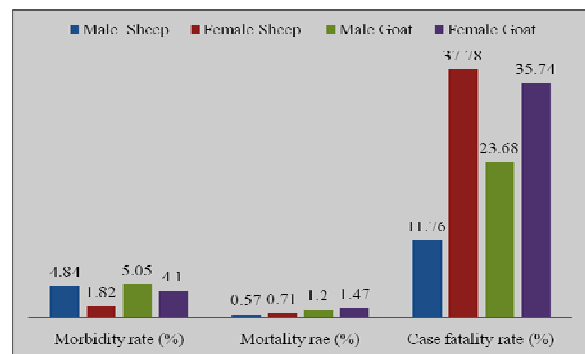


Fig. 4: Sex specific measure of peste des petits ruminants in small ruminants

mortality and case fatality rates were 17.39%, 6.35% and 36.54%, respectively in young goats and 2.87%, 0.94% and 32.54% in adult goats respectively (Fig. 2). Infection and severity of the disease were more in young animals than adults of both species. Tiwari (2004), Zahur et al. (2009) and Abd El-Rahim et al. (2010) also reported similar findings. Higher incidence of PPR in young ones might be due to sub-clinical coccidial and bacterial infections and low level of immunity which enhanced the effect of PPRV as reported by Kumar et al. (2001) and Mahajan et al. (2013).

c) Breed specific measure

Morbidity, mortality and case fatality rates were 4.85%, 1.82% and 37.50% in Trichy Black, 1.46%, 0.56% and 38.67% in Mecheri and 7.60%, 1.90% and 25.00% in Non-descript breeds of sheep, respectively (Fig. 3). Infection rate and severity of the disease were more in Non-descript and Mecheri breeds of sheep than other breeds.

Morbidity, mortality and case fatality rates were 14.04%, 5.18% and 36.89% in Tellicherry, 3.17%, 1.55% and 38.46% in Jamunapari and 1.17%, 0.26% and 22.22% in Non-descript breeds of goats, respectively. Infection rate and severity of the disease were more in Tellicherry and Jamunapari breeds of goats than other breeds. Paritosh Majumder (1997) also observed breed predisposition in the incidence of PPRV infection.

d) Sex specific measure

Morbidity, mortality and case fatality rates were 4.84%, 0.57% and 11.76% in male and 1.82%, 0.71% and 37.78% in female sheep, respectively (Fig. 4). On the other hand, morbidity, mortality and case fatality rates were 5.05%, 1.20% and 23.68% in male and 4.10%, 1.47% and 35.74% in female goats, respectively. Rengasamy et al. (2007) also observed that males are mostly susceptible than females. Higher infection rate in males might be due to frequent shifting from one place to other place for breeding and trade purposes. Higher severity of the disease in females might be due to physiological stress associated with pregnancy and lactation.

Conclusion

Specific measures indicate that species, age, breed and sex predisposing exist in the infection rate and severity of PPR in sheep and goats. Therefore, it is important to consider the above factors when attempting prevention or eradication of the disease with appropriate vaccines.

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