MEDIRES
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Journal of Internal Medicine and Health Affairs
info@mediresonline.org

ISSN: 2836-2411 Mini Review

Risk Factors for Echinococcosis in the Kyrgyz Republic

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Received Date: July 12, 2023; **Accepted Date:** August 17, 2023; **Published date:** September 18, 2023

Citation: Raimkulov K.M (2023). Risk Factors for Echinococcosis in the Kyrgyz Republic. Journal of Internal Medicine and Health Affairs. 2(1). DOI:10.58489/2836-5038/026

Abstract

The epidemic of echinococcosis in Kyrgyzstan began after the collapse of the Soviet Union and was associated with a change in agricultural practices: the closure of large organized collective farms and the cessation of nomadic sheep breeding, which separated livestock from agriculture.The peak incidence occurred in 2014 and amounted to 20.2 per 100,000 population per year. Major disease control efforts have been made since 2008, and after 2016 there has been a slow decline in incidence. Despite these successes, the incidence remains at a high level [1, 2, 3].

Keywords: *echinococcus, cystic echinococcosis, prevalence, risk factors, transmission, endemic.*

Materials and methods

In Osh, Naryn and Batken regions of the Kyrgyz Republic in 2015–2017, an ultrasound examination was conducted and 10,093 people were interviewed for potential risk factors.

Results

The prevalence of echinococcosis in the studied regions (Naryn and Batken regions or in the districts of Osh region) ranged from 0.2% (Aravan region) to 25.2% (Nookat region). Typical risk factors such as having a dog or sheep had little effect on the risk of echinococcosis (hazard ratio, RR 1.2–1.8). The only significant “occupational” risk factor was retired status (RR 2.12, p<0.0001), which may be associated with a higher cumulative risk of infection. At the same time, the status of a housewife, associated in other studies with the risk of echinococcosis, was even a negative factor in our study (RR 0.76; 95% CI 0.65– 0.93; p<0.05). Risk factors in the study regions varied significantly. Livestock ownership was a significant risk factor only in Nookat and Kara-Kulzha districts, dog ownership only in Nookat district and Naryn oblast. The profile of risk factors did not always match the classical transmission routes of echinococcosis (no risk from keeping livestock and dogs in many areas).

At the same time, a high and statistically significant risk was found from risk factors characteristic of soil-borne helminthiases - the use of well water (RR 2.0; 95% CI 1.5–2.8; p<0.0001), growing vegetables for sale (RR 1 .4; CI 1.1-1.7; p<0.001) and the presence of cats (RR 2.28; CI 1.8-2.8; p<0.0001), which could be a factor in the mechanical transfer of eggs into the house.

Although some of these factors could theoretically be a statistical artifact related to lifestyle, we were unable to identify such associations (for example, cat ownership and retired status).

Some districts have extremely high values of risk factors, such as horse ownership in the Kara-Kulzha region (RR 23.2; CI 6.4–84.4; p<0.001), which is most likely a statistical artifact, but highlights heterogeneity of the epidemic across regions.

Conclusion

Different incidence rates and different risk profiles indicate that the echinococcosis epidemic in Kyrgyzstan is not a single holistic epidemic in terms of potential mechanisms and risk factors. Successful control of echinococcosis requires a detailed risk assessment and the development of priority

interventions at least at the district level, and possibly even smaller administrative units, since some districts can greatly benefit from preventive measures, the effectiveness of which in other places will be limited. The profile of risk factors indicates that prevention should be communal rather than individual.

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