

Persistent Endemicity of Human Brucellosis in Iran: An Underestimated Zoonotic Threat Requiring Strengthened One Health Control Dear Editor,

Piruz Shadbash^{1*}

¹*Department of Microbiology and Microbial Biotechnology, Faculty of Life Sciences and Biotechnology, Shahid Beheshti University, Tehran, Iran*

**Corresponding author: Piruz Shadbash*

Email address: shadbashpiruz@gmail.com

ORCID ID: 0009-0008-1328-482X

Brucellosis remains one of the most prevalent zoonotic bacterial infections in the Middle East, with Iran classified as a high-incidence country. Caused primarily by *Brucella melitensis* and *Brucella abortus*, the disease is transmitted to humans through direct contact with infected livestock or consumption of unpasteurized dairy products [1]. Despite decades of control efforts, brucellosis continues to impose a substantial public health and economic burden in Iran.

Human brucellosis is characterized by protean clinical manifestations, including prolonged fever, arthralgia, hepatosplenomegaly, and potential focal complications such as spondylitis and endocarditis [1]. The nonspecific presentation frequently delays diagnosis, contributing to chronicity and relapse. Globally, more than 500,000 new human cases are estimated annually, with the highest incidence reported from the Mediterranean basin and Western Asia [1].

Iran has reported persistent endemic transmission, particularly in rural provinces where animal husbandry is common. The increasing incidence of brucellosis in Iran is mainly attributable to continued animal-to-human transmission in rural settings, informal movement of infected livestock, inadequate vaccination coverage in small ruminants, and persistent exposure through traditional dairy consumption practices. [2,3]. *B. melitensis*, the most virulent species for humans, predominates in Iran and is associated with more severe clinical disease [3].

From a therapeutic perspective, treatment requires prolonged combination antibiotic regimens to prevent relapse. The World Health Organization recommends doxycycline combined with rifampicin or streptomycin; however, treatment failures and relapse rates remain significant, especially in complicated cases [1,4]. No licensed human vaccine is currently available, underscoring the importance of animal vaccination and food safety interventions.

A coordinated One Health strategy is therefore essential. One Health is an integrated approach that recognizes the interconnected health of humans, animals, and the environment in preventing and controlling zoonotic diseases such as brucellosis [5]. Strengthening livestock vaccination programs, enhancing surveillance systems, improving laboratory diagnostic capacity (including molecular typing), and promoting pasteurization awareness campaigns could substantially reduce transmission. Regional cross-border cooperation is

equally critical given livestock movement between neighboring endemic countries because the movement of livestock across neighboring endemic countries can facilitate the introduction and reintroduction of infected animals, sustain transmission cycles, and undermine national control efforts.

In conclusion, brucellosis remains an underestimated but persistent zoonotic threat in Iran. Reinforcing integrated human-animal health strategies is imperative to reduce disease burden and prevent long-term complications.

References

- [1] Ghssein G, Ezzeddine Z, Tokajian S, Khoury CA, Kobeissy H, Ibrahim JN, et al. Brucellosis: Bacteriology, pathogenesis, epidemiology and role of the metallophores in virulence: a review . *Front Cell Infect Microbiol*. 2025 Jul 8;15:1621230. doi: 10.3389/fcimb.2025.1621230
- [2] Amini M, Alamian S, Talebhemmat M, Dadar M. Equine brucellosis in Iran: serological, bacteriological and molecular analysis. *Vet Res Commun*. 2024 Jun;48(3):1511-1519. doi: 10.1007/s11259-024-10332-0
- [3] Zeinali M, Doosti S, Amiri B, Gouya MM, Godwin GN. Trends in the Epidemiology of Brucellosis Cases in Iran during the Last Decade. *Iran J Public Health*. 2022 Dec;51(12):2791-2798. doi: 10.18502/ijph.v51i12.11470
- [3] Dadar M, Alamian S. Isolation of *Brucella melitensis* from seronegative camel: potential implications in brucellosis control. *Prev Vet Med*. 2020 Dec;185:105194. doi: 10.1016/j.prevetmed.2020.105194
- [4] Lavigne JP, Magnan C, Loubet P, Sotto A, O'Callaghan D, Keriell A. What's new in the diagnosis and treatment of human brucellosis?. *Infect Dis Now*. 2025 Nov;55(7):105121. doi: 10.1016/j.idnow.2025.105121
- [5] Pitt SJ, Gunn A. The One Health Concept. *Br J Biomed Sci*. 2024 Feb 15;81:12366. doi: 10.3389/bjbs.2024.12366