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Commentary note

Commentary on: Brucellosis in Iraq: A comprehensive overview of public health and agricultural challenges

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Abstract

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Commentary note

We have read with great interest the article of Ilyas et al. (2024) titled "Brucellosis in Iraq: A comprehensive overview of public health and agricultural challenges". This article enhances our understanding of brucellosis's multifaceted challenges to public health, agriculture, and the food industry in Iraq. It critically reviews transmission dynamics, epidemiological trends, and diagnostic approaches, providing a comprehensive analysis of the disease's impact on human and animal health in this country (Ilyas et al., 2024). Given the current health and economic repercussions of brucellosis in Iraq, this review is particularly significant. The article addresses brucellosis as a primary zoonotic disease in this country, discussing its prevalence, diagnosis, and potential control measures. The authors analyzed 36 original articles published in the English literature from 1979 to 2023. Total brucellosis prevalence rates were 36.28% among 5,663 human cases and 10.97% among 12,227 animals, mainly goats, sheep, buffaloes, cattle, and, to a lesser extent, dogs and rams. Of 50 cheese sample studies, *Brucella* was detected in 6 (12%). The article's strengths include detailed human and animal epidemiological data analysis for different provinces in Iraq, a focus on higher female brucellosis prevalence among human cases, and the strength and limitations of diagnostic tests (Rose Bengal Test, ELISA, and PCR). Brucellosis poses a significant health risk to humans and animals in Iraq, especially in rural areas, and represents a significant economic burden. Consequently, there is a pressing need to enhance existing surveillance and control strategies to mitigate the transmission of *Brucella* among occupationally exposed individuals, the general population, and animal populations in Iraq (Ilyas et al., 2024).

Key strengths of the original article

Brucellosis is an endemic and zoonotic disease among humans and a wide variety of animals in Middle Eastern countries and is associated with economic losses and public health concerns (Dadar et al., 2024). The significant aspect of the study of Ilyas and colleagues is its comprehensive coverage of human and animal brucellosis in Iraq, which provides valuable insights for the medical and scientific community, as well as for policymakers and public health professionals. This review offers a thorough and detailed analysis of brucellosis in human areas across various regions of Iraq, highlighting its merits in breadth, data presentation, and innovative methodologies. The review provides significant insights into brucellosis's geographical distribution and prevalence by incorporating extensive epidemiological data from multiple provinces, including Baghdad, Mosul, Babil, and Erbil. Data on diagnostic methods are provided, including the Rose Bengal Test (RBT), ELISA, and PCR, to elucidate the advantages and disadvantages of each, providing a comprehensive knowledge of their relevance in endemic areas. The investigation of particular risk factors, such as the consumption of raw milk, contact with livestock, and demographic vulnerabilities, highlights the public health ramifications of the findings (Dadar et al., 2020). The identified seasonal and demographic patterns enhance the analysis, emphasizing the interaction of environmental and behavioral factors in disease transmission. Additionally, identifying *Brucella* species, such as Brucella abortus and *Brucella melitensis*, and their respective biovars showcases the article's innovative approach of combining molecular diagnostics with public health guidelines. This comprehensive and organized presentation of data improves our understanding of brucellosis and provides a strong basis for implementing effective control and prevention strategies in Iraq.

Critical perspective

This article provides a thorough summary of animal and human brucellosis in Iraq. However, several aspects require further discussion. Thus, the article might be improved by elaborating on the limitations of the data used in the review. While it provides a detailed analysis of brucellosis prevalence among humans and animals in various regions of Iraq, the article does not adequately address potential biases in the data. These include regional reporting inconsistencies, diagnostic method variability, and the absence of standardized reporting practices over time. The prevalence rates indicated in the article correspond to human and animal populations tested explicitly for brucellosis. However, these populations are not well defined and likely differ from studies. Therefore, the reported prevalence rates might not be extrapolated to Iraq's general population or to each province's population.

Many diagnostic procedures, including the RBT, ELISA, and PCR, are applied inconsistently across studies, which can compromise the accuracy and comparability of the results. It would have been helpful to specify better if the diagnostic tests mentioned were used to evaluate brucellosis seroprevalence in humans and animals (e.g., using ELISA) or active brucellosis infection (e.g., combining ELISA and PCR). Accurate evaluation of the prevalence of active brucellosis is much more challenging due to the frequent chronic nature of *Brucella* infection in humans and animals and difficulties in detecting *Brucella* by culture or PCR. Furthermore, while the article discusses the varying prevalence rates of brucellosis among different animal species, it overlooks the influence of environmental factors, such as agricultural practices and livestock management, on these rates. Discussing these aspects could enhance our understanding of brucellosis epidemiology in Iraq.

Risk factors are well described, but the authors could have specified that they greatly vary according to the human population considered. For example, farmers can be exposed to *Brucella* through contact with livestock or consuming contaminated raw milk and derived dairy products. In contrast, the general population (especially the urban population) is more likely to be infected by consuming *Brucella*-contaminated dairy products. The authors could also specify that host-specificity among *Brucella* strains is relative in animals (e.g., *B. melitensis* can infect cattle) and that *B. melitensis* is the most virulent *Brucella* species in humans. Additionally, the paper could benefit from exploring the broader socio-economic context and public health implications of brucellosis in Iraq. Although there is a primary focus on epidemiological data and diagnostic techniques, the economic impact of the disease—particularly in rural areas where agriculture and animal husbandry are crucial for livelihoods—could be examined in greater depth. The article briefly

mentions the financial consequences but does not thoroughly analyze how brucellosis affects local economies, especially in regions reliant on livestock for food and income. Moreover, the article should highlight the challenges of implementing control measures, such as immunization and culling, in conflict-affected or resource-limited areas, which are prevalent in Iraq. Addressing these socio-economic and logistical challenges would provide a more comprehensive understanding of the issue, aiding policymakers and public health professionals in developing more effective, context-specific interventions.

While the focus is on epidemiological statistics and diagnostic methods, the paper could benefit from a more in-depth exploration of existing and potential control strategies. Although the article mentions public health recommendations such as milk pasteurization and animal testing, it does not evaluate their effectiveness or discuss their implementation in Iraq's socio-economic context. Additionally, the lack of studies in Arabic and Kurdish limits the review's comprehensiveness. The literature review may be overlooking local insights into the prevalence of the illness and control measures. Including non-English studies could offer a better reflection of the situation. Finally, the authors mentioned that brucellosis control in specific regions requires a One Health approach, i.e., evaluating, surveillance, and controlling the prevalence of *Brucella* in humans, animals, and their environment. Thus, the article might be improved by elaborating on the limitations of the data used in the review.

Future directions or research

Future research should prioritize conducting long-term studies to strengthen brucellosis surveillance in humans and domestic animals and assess the effectiveness of current control efforts, such as vaccination programs and animal culling techniques, in managing brucellosis transmission. A thorough examination of the economic impact of brucellosis on both the human and agricultural sectors would help policymakers allocate resources more effectively for prevention and treatment. Collaboration among public health professionals, veterinarians, and agricultural specialists is essential to develop integrated strategies that address brucellosis from both human and animal health perspectives. Given that Iraq shares nearly open borders with several brucellosis-endemic countries, such as Iran (Dadar and Alamian 2025), Turkey (Akar and Öz 2023), and Kuwait (Al-Sherida et al. 2020), it is crucial to highlight the potential for transboundary transmission of the infection, particularly due to the nomadic lifestyle prevalent in this region.

In conclusion, the authors of the highlighted article provide a comprehensive perspective on the subject by addressing both public health and agricultural issues. Future research should focus on enhancing the evaluation of control measures, incorporating a wider array of literature, and examining the long-term effects of brucellosis on human health and the agricultural economy. This article is a vital foundation for future research and policy development to tackle brucellosis in Iraq.

Article Information

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Authors contribution. All authors wrote, read, and approved the final article.

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