

Article

Assessing Portuguese Public Health Literacy on *Legionella* Infections: Risk Perception, Prevention, and Public Health Impact

Susana Dias ¹, Maria Margarida Passanha ¹, Margarida Figueiredo ^{2,3} and Henrique Vicente ^{2,4,5,*} 

¹ Laboratório Regional de Saúde Pública de Évora, Instituto Nacional de Saúde Doutor Ricardo Jorge, Hospital do Espírito Santo, Edifício do Patrocínio, 4.º Piso, Av. Infante D. Henrique, 7000-811 Évora, Portugal; susana.dias@insa.min-saude.pt (S.D.); margarida.passanha@insa.min-saude.pt (M.M.P.)

² Departamento de Química e Bioquímica, Escola de Ciências e Tecnologia, Universidade de Évora, Rua Romão Ramalho, 59, 7000-671 Évora, Portugal; mtf@uevora.pt

³ CIEP—Centro de Investigação em Educação e Psicologia, Universidade de Évora, Rua da Barba Rala, 1, Edifício B, 7005-345 Évora, Portugal

⁴ LAQV REQUIMTE—Laboratório Associado para a Química Verde da Rede de Química e Tecnologia, Universidade de Évora, Rua Romão Ramalho, 59, 7000-671 Évora, Portugal

⁵ LASI—Laboratório Associado de Sistemas Inteligentes, Centro Algoritmi, Universidade do Minho, Campus de Gualtar, Rua da Universidade, 4710-057 Braga, Portugal

* Correspondence: hvicente@uevora.pt

Abstract

Legionella is an environmental bacterium capable of causing severe respiratory infections, with outbreaks posing significant public health challenges in developed countries. Understanding public awareness of *Legionella* transmission, risk perception, and preventive behaviors is crucial for reducing exposure and guiding health education strategies. This study aimed to evaluate the Portuguese population's knowledge of *Legionella* infections and their readiness to adopt preventive measures. A structured questionnaire was developed and administered to 239 participants aged 18–76 years across Portugal, collecting socio-demographic data and assessing literacy through statements organized into domains related to *Legionella* risk, control measures, and public health impact. The results indicate that participants possess moderate to high awareness of *Legionella* severity, transmission routes, and preventive strategies, yet gaps remain in understanding key risk factors, optimal water system maintenance, and the influence of temperature on bacterial growth. Age, educational attainment, and occupational status were associated with differences in self-assessed literacy levels. Artificial neural network models were applied to classify literacy levels, achieving a near 90% accuracy and demonstrating higher confidence in low and moderate categories. These findings provide insights for designing tailored educational programs, improving public health communication, and enhancing preventive behaviors to reduce *Legionella* infection risks.

Keywords: public health literacy; *Legionella*; risk perception; health education; water distribution systems; artificial neural networks



Academic Editor: Jing Guo

Received: 21 September 2025

Revised: 6 October 2025

Accepted: 10 October 2025

Published: 12 October 2025

Citation: Dias, S.; Passanha, M.M.; Figueiredo, M.; Vicente, H. Assessing Portuguese Public Health Literacy on *Legionella* Infections: Risk Perception, Prevention, and Public Health Impact. *Water* **2025**, *17*, 2940. <https://doi.org/10.3390/w17202940>

Copyright: © 2025 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).