

# The Association between Water, Sanitation, Hygiene, and Child Underweight in Punjab, Pakistan [Letter]

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## Dear editor

I read with great interest the study by Nadeem et al on “The Association between Water, Sanitation, Hygiene, and Child Underweight in Punjab, Pakistan”.<sup>1</sup> This research provides valuable insights into the critical relationship between WASH factors and child nutrition in a low-middle income setting. However, I would like to highlight some limitations and opportunities for future research.

The cross-sectional design limits causal inferences between WASH factors and underweight status. Longitudinal studies are needed to elucidate the temporal relationships and long-term impacts.<sup>2</sup> Additionally, while the study controlled for several confounders, unmeasured factors like dietary intake, food security, and healthcare access could influence the observed associations.<sup>3</sup>

The use of binary categorizations for WASH variables (improved vs unimproved) may oversimplify the complex nature of these exposures. Future research could benefit from more nuanced measures of water quality, sanitation adequacy, and hygiene behaviors.<sup>4</sup> Furthermore, the study did not assess the consistency and proper use of WASH facilities, which are crucial for realizing their health benefits.

While the population attributable fraction (PAF) analysis provides useful policy insights, it assumes a causal relationship and full reversibility of risk, which may not hold true for complex nutritional outcomes.<sup>5</sup> Caution is warranted in interpreting these estimates.

Despite these limitations, this study makes a significant contribution to understanding the WASH-nutrition nexus in Pakistan. The findings underscore the importance of integrating WASH interventions with nutrition programs to address child undernutrition comprehensively. Future research should explore the mechanisms linking WASH to nutritional outcomes and evaluate the effectiveness of integrated interventions.

In conclusion, Nadeem et al have provided valuable evidence to inform policies aimed at reducing child undernutrition in Punjab. As research in this field progresses, addressing the highlighted limitations will further strengthen our understanding of how WASH impacts child nutrition in low-resource settings.

## Disclosure

The author reports no conflicts of interest in this communication.

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