Cost analysis of the NIRUDAK & DHAKA clinical diagnostic model for volume deficit in patients with acute diarrhea

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Background

- With over 6.5 billion cases and 1.4 million deaths in 2019, diarrheal diseases are a major cause of morbidity and mortality and place a heavy burden on healthcare systems worldwide
- While the World Health Organization's (WHO) guidelines[1] on acute diarrhea management is the standard practice of care worldwide, the NIRUDAK[2] and DHAKA[3] models, which assesses dehydration severity in patients over and under 5 years of age respectively, have been more recently developed
- Gaps remain in the literature with regards to cost of care for acute diarrhea management management especially in LMICs
- This study aims to compare simulated treatment costs of acute diarrhea management of the WHO guidelines to the NIRUDAK and DHAKA models

Methods

- Cost of care for each patient presenting to the International Centre for Diarrhoeal Research, Bangladesh's (icddr,b) Dhaka Hospital between March 2019 – March 2020 represents the summed costs of:
  - fluid administered
  - hospital fees
  - equipment (e.g. IV tubing and needles)
- NIRUDAK model: total costs of resuscitation & cost of fluid required for initial resuscitation (within first 6 hours of admission) were calculated and reported as median and interquartile range (IQR) in USD
- DHAKA model: due to data limitations, total costs of fluid were calculated and reported as median and IQR in USD

Results

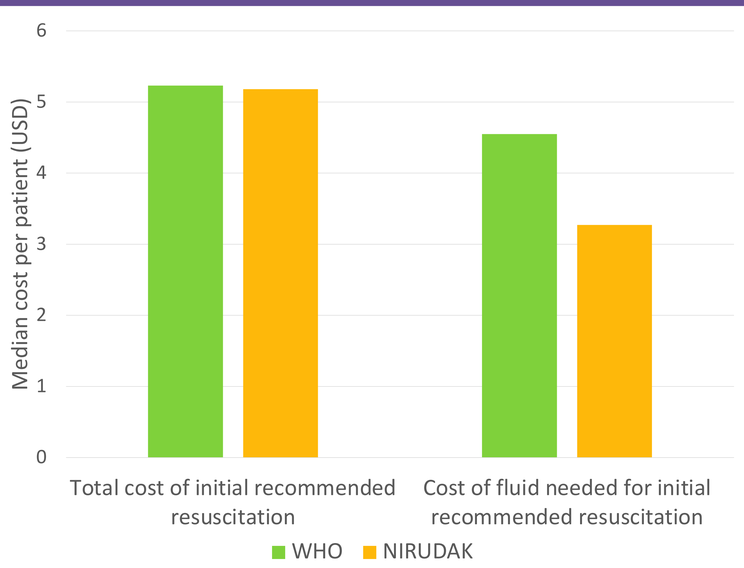

Figure 1. Summary of cost comparisons — NIRUDAK model

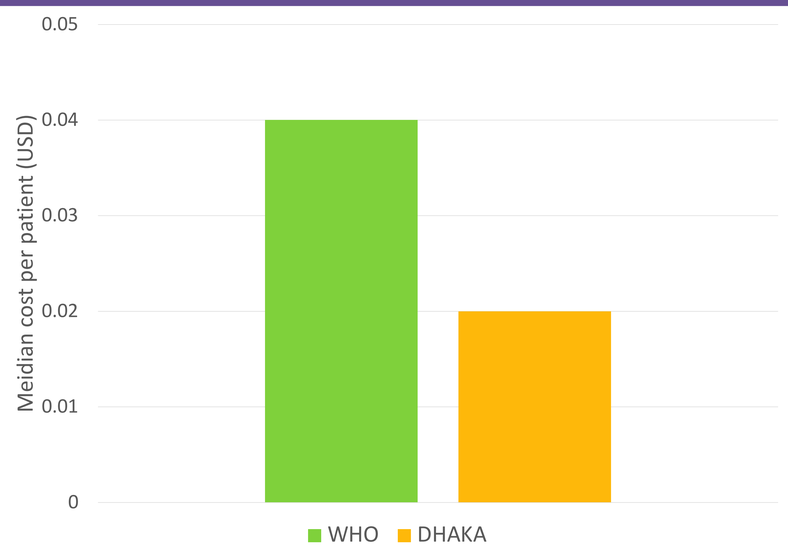

Figure 2. Total cost of fluid — DHAKA model

- NIRUDAK model, median total cost per patient: $5.18 (IQR: 0 – 25.56)
  - WHO: $5.23 (IQR: 5.09 – 22.17)
- NIRUDAK model, median initial fluid resuscitation cost per patient: $3.27 (IQR: 0 – 4.27)
  - WHO: $4.55 (IQR: 0 – 5.76)
- DHAKA model, total fluid cost: $0.02 (IQR: 0 - 0.97)
  - WHO: $0.04 (IQR: 0.03 - 1.24)

Conclusion

- Implementing the most cost-effective approach to diarrhea management will help optimize allocation of resources, which is especially critical in low resource settings
- Measuring the societal cost savings (e.g., of hospital beds, physician and nurse labor, transportation to healthcare facilities, etc.) is beyond the scope of this analysis
- However, more accurately diagnosing patient dehydration severity can free up hospital beds and resources for the most severely ill patients, saving moderately ill patients the costs of in-patient care
- Thus, the NIRUDAK and DHAKA models may provide positive externalities unable to be captured here

References & Disclosures

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