

# The Water@Birth Study: an exploratory study on the requirements of water for hand hygiene during labour and delivery in low-income countries

Iyabo Adekunle-Olarinde<sup>a</sup>, Wendy Graham<sup>a,b</sup>, Suzanne Cross<sup>b</sup> and Jolene Moore<sup>c</sup>

<sup>a</sup>School of Medicine, Medical Science and Nutrition, University of Aberdeen, Aberdeen, UK; <sup>b</sup>London School of Hygiene and Tropical Medicine, The Soapbox Collaborative, Aberdeen, UK; <sup>c</sup>NHS Grampian, Aberdeen, UK

**Background:** Infections acquired during childbirth are one of the leading causes of maternal death; the majority of these deaths occur in low-income settings. Hand hygiene is one of the most effective ways of preventing infection but requires basic resources, such as running water, to be performed. Limited literature on water volume requirements for hand hygiene in healthcare facilities exists despite the importance of this information, particularly in resource-poor settings.

**Aim:** To establish the volume of water required for hand hygiene during childbirth in low income countries.

**Methods:** Data was collected in Aberdeen Maternity Hospital (AMH) and Felege Hiwot Referral Hospital, Ethiopia (FHRH), with an average of 14 and 16 deliveries per day respectively. Primary data on hand hygiene opportunities (HHOs) during childbirth were gathered using observational methods, and secondary data gathered from register and case-note reviews. The volume of water required for each HHO (H<sub>2</sub>O/HHO) was calculated by multiplying flow rate by hand washing time. Estimates of water requirements were derived by calculating the number of HHOs during childbirth and the H<sub>2</sub>O/HHO. Water requirement estimates from each facility were compared to each other as well as to WHO recommendations. Due to skewed data, Spearman's rho was utilised to explore the relationship between variables.

**Results:** Eleven deliveries were observed in AMH and 20 in FHRH. The number of HHOs was largely determined by the length of labour. Stringently following WHO recommendations lead to a significantly higher number of HHOs than was performed in clinical practice at both sites. Hand washing also occurred for a much shorter time than the WHO recommendation of 40–60 seconds, with an average of 24 seconds in AMH and 25 seconds in FHRH observed. The estimated number of HHOs at sites ranged from 5 to 16 per hour per delivery and water consumption from 21 to 159.6 litres per hour per delivery. Hand hygiene was estimated to require 8937.6 litres and 4838.4 litres per day or 638.4 litres and 302.4 litres per delivery for AMH and FHRH, respectively.

**Conclusions:** Water requirements are variable due to the nature of childbirth but are not currently met in low-income countries. In terms of performance of hand hygiene, there is a large gap between clinical and recommended practice and thus room for improvement. The volume of water required for hand hygiene has significant implications for water requirements within maternity units, particularly in resource-poor settings. Further research on water requirements is merited to improve the targeting of limited resources.