Water quality and supply, sanitation and hygiene (WASH) practices – what do we know about their effects on the nutritional status of children?

THE COCHRANE COLLABORATION®
PUBLIC HEALTH GROUP

SUMMARY

Background

In low-income countries an estimated 165 million children under the age of five years suffer from chronic undernutrition causing them to be short in height (stunting), and 52 million children suffer from acute undernutrition causing them to be very thin (wasting). Poor growth in early life increases the risks of illness and death in childhood. Infectious diseases such as diarrhoea are a direct cause of undernutrition. Improving access to clean water, sanitation and soap is likely to reduce microbiological and parasitic infestations in early childhood, thereby providing an enabling environment for healthy childhood growth.

It is currently unknown whether water quality and supply, sanitation and hygiene (WASH) interventions have a positive effect on nutritional outcomes in children. It is therefore important to review all the available evidence from research studies to determine whether such interventions can make a difference. This review specifically examined the effect that WASH interventions may have on two key measures of nutritional status in children, namely anthropometry (or physical growth) and biochemical measures of nutritional health.

What was done?

International evidence on WASH interventions was reviewed. Included in the review were interventions designed to (i) improve the microbiological quality of drinking water or protect the microbiological quality of water prior to consumption; (ii) introduce new or improved water supply or improve distribution; (iii) introduce or expand the coverage and use of facilities designed to improve sanitation; or (iv) promote handwashing with soap after defecation and disposal of child faeces, and prior to preparing and handling food, or a combination of these interventions, in children aged under 18 years. Any study comparing WASH interventions with a control group, such as randomised (including cluster-randomised), quasi-randomised and non-randomised controlled trials, controlled cohort or cross-sectional studies and historically controlled studies, was included. Data were collected on anthropometry, biochemical measures of micronutrient status, adherence, attrition and costs. The review covers evidence published up to June 2012.

What was found?

Five cluster-randomised controlled trials and nine non-randomised studies with comparison groups from 10 low and middle-income countries were found, providing nutrition outcome data for 9,469 children. Study duration ranged from 6 to 60 months and all studies included children under five years of age at the time of the intervention. Studies included WASH interventions either singly, such as the installation of water pumps or in combination, such as hand-washing promotion with improved water quality. The studies identified were not deemed to be of high methodological quality.

Meta-analysis of data from cluster-randomised controlled trials suggested that WASH interventions (specifically solar disinfection of water, provision of soap, and improvement of water quality with an intervention time of 9 – 12 months) slightly but significantly increased growth in height in children under 5 years of age.

What does the review tell us?

The available evidence from meta-analysis of data from cluster-randomised controlled trials is suggestive that some WASH interventions (specifically solar disinfection of water, provision of soap, and improvement of water quality) may slightly improve growth in height in children <5 years of age. The quality of the evidence is generally poor and the estimates are based only on meta-analyses of data from interventions of relatively short-duration (9-12 months) from only a small selection of possible WASH interventions. These estimates are therefore not applicable to the effect that wider WASH interventions may have on child nutritional status, as measured by anthropometry and biochemical measures of micronutrient status. There are several ongoing trials in low-income country settings that may provide robust evidence to inform these findings in the future. These studies will be included in future updates of the review.

What does the review recommend?

The review suggests that providing clean water, sanitation and hygiene may have a small but important impact on the growth of young children. This finding identifies that improving access to water, sanitation and hygiene could potentially be a key part of the tool kit to tackle the global burden of undernutrition. Policy-makers and practitioners in this field should therefore be encouraged, from what evidence there is available, that WASH interventions have the potential to improve nutritional outcomes.

This review also identified the paucity of rigorous evidence evaluating the effect of WASH interventions on child nutritional status. Further research is needed to address the mechanisms of action of the WASH interventions. Research examining the long-term adherence to WASH interventions, the optimal timing of interventions in childhood or the required duration of interventions to have the greatest impact on childhood nutrition outcomes, is also required.

Dangour AD, Watson L, Cumming O, Boisson S, Che Y, Velleman Y, Cavill S, Allen E, Uauy R. Interventions to improve water quality and supply, sanitation and hygiene practices, and their effects on the nutritional status of children. Cochrane Database of Systematic Reviews 2013. DOI: 10.1002/14651858.CD009382.pub2

For more information about the review please contact Alan Dangour: alan.dangour@lshtm.ac.uk

Cochrane Public Health Group acknowledges the funding of the Victorian Health Promotion Foundation, The Jack Brockhoff Foundation and NHMRC (Australia).