Guidance for 
Mineral & Electrolyte Concentrations in Water 
Used in Inpatient Therapeutic Feeding Centers

Syed Imran Ali1, Jen Turnbull1, Matt Arnold1, Francesca Holt1, Tanya Narang1, Sayo Falade1, Saskia van der Kam2, Jean-François Fesselet2, and James Orbinski1

1 Dahdaleh Institute for Global Health Research, York University, Toronto, Canada. 2 Public Health Department, Médecins Sans Frontières, Amsterdam, The Netherlands.

BACKGROUND and PROJECT OBJECTIVE

High concentrations of minerals might influence treatment outcomes of Severe Acute Malnourished (SAM) patients

Unusual mortality was observed in an ITFC during the 2017 nutritional crisis in Somali region of Ethiopia. Highly mineralized groundwater might have impacted treatment outcomes of SAM patients. This project has the objective of synthesising knowledge and developing concrete guidelines for field teams.

RESULTS: RISK ASSESSMENT

• Possible risks from 24 minerals.
• Exposure assessment of total intake from water, milks, ORS by standard treatment protocols.
• Water in project compared with standard upper limits of intake and water guidelines from various regulatory bodies.

RESULTS: EXPERT PANEL

• Mineral concentration of water not considered when therapeutic milks (F100, F75) were developed!
• There are no clear upper limits for SAM patients
• Consider osmolarity and renal solute load (RSL)
• Metabolic/physiological pathways of minerals

RESULTS: LITERATURE REVIEW

• Find all available data on upper limits of intake for minerals and outcomes for SAM patients
• Followed PRISMA and PICO approach

Only 6 articles found with relevant data and 3 of these were opinion pieces. SERIOUS KNOWLEDGE GAP!

KEY FINDINGS

Provisional Upper Limits (PUL) for 6 parameters for SAM:
• Nitrate/nitrite Risk: toxic, methemoglobinemia PUL: no evidence to deviate from existing water guidance
• Magnesium Risk: osmotic diarrhoea PUL: laxative dose
• Sulphate Risk: osmotic diarrhoea PUL: no evidence to deviate from existing water guidance
• Sodium Risk: hyponatraemia PUL: no evidence to deviate from existing medical guidance
• RSL Risk: overload kidneys: PUL:RSL from food, not water
• Osmolarity Risk: osmotic diarrhoea PUL: from food, not water

For all minerals clinical studies are needed to fine tune PUL.

Field Water Quality Testing:
• TDS (Total Dissolved Solids): can establish TDS threshold based on PUL above which water may be hazardous for SAM kids; if so, elevate to test all minerals via lab + treat water
• Nitrate: Use rapid photometer test (does not figure in TDS)

DISCUSSION:

An under-considered risk in ITFCs
• Potentially large problem, extent unknown: needs investigation to characterise global extent and epidemiology
• More elements need PUL: Ca, Cl, As, etc.
• Lack of field guidance
• Physiology minerals in SAM poorly understood

CONCLUSIONS

• Guidance for field needed
• Extent of problem unknown, pull data from all actors
• Evidence lacking on limits of intake for SAM
• Clinical studies needed to finetune PUL
• Important to other situations, e.g. home situation (eg nitrate), neonatology and antenatal care

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