

The Urban Health Project, Karachi

Sir – The article by Tollman & Zwi on health system reform and the role of field sites is a call to re-examine this role in relation to evidence-based policy and programme development (1). The authors note their intention to document all existing demographic and health surveillance field sites in Africa, Asia and Latin America. This is timely in terms of the Urban Health Project (UHP) of the Aga Khan University, which has just completed a grant funding cycle.

Primary health care interventions over a 10-year period have achieved major reductions in infant and maternal mortality at project sites in squatter settlements of Karachi, Pakistan, with significant lessons for urban health systems development. In view of the recognition by the World Bank that Karachi is representative of many large cities in developing countries, where the public sector has had difficulty coping with rapid urban growth (2), there is merit in sharing this experience with other countries.

The Aga Khan University has pursued the systems development aspect of its work through prototype projects in urban and rural health settings (3). The UHP falls into a category of projects that has contributed to the development of national programmes of primary health care and family planning and provincial health systems development at the district level, including the implementation of health information systems. In Karachi itself, such projects have helped to complement an overwhelmed public sector and constitute models of good practice (4). While UHP was the first project of its type in Pakistan, other health science institutions have since launched similar initiatives, transforming the earlier model of institution-based education into one that is now more integrated with primary health care.

As communities reach new levels of capacity, the initiatives, emphases and even actual project sites necessarily change. For example, the management information system approach reported in 1993 was quite elaborate, and efforts were required to simplify it (3). Greater use is now made of surveys to assess health status and the impact of interventions (5). Tollman & Zwi comment that field sites can support

investigations for efficacy and effectiveness, as well as action research. Recent examples of such investigations from UHP include iron supplementation strategies in pregnancy, access to emergency obstetric care, water quality technology, and contraceptive choices.

When viewed as a platform for the assessment of more discrete interventions, however, the distinction blurs between “demographic and health surveillance” field sites and other field sites with more specific purposes. After all, most interventions must eventually be tested in operational settings that reflect reality. To justify the distinction, one must return to the primary health care agenda, including the elements of community participation, sustainable local organizations with representative structures, income generation, and gender equity.

There clearly is a need for open, objective and ongoing scientific debate on how to obtain full benefit from the extraordinary efforts that have brought such valuable field sites into existence, and their potential to contribute to new knowledge and policy applications. It is equally clear that producing and disseminating transferable results from these field sites, to demonstrate their value, will play a key role in their future viability. ■

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Copper contamination from domestic tap water with a descaler

Sir – Drinking-water is potentially a major source of copper exposure because of the widespread use of copper pipes in household plumbing. We describe a patient who complained of abdominal pain and green hair. Examination revealed high levels of copper in the blood, urine and hair, which we were able to link to the installation of a household descaling device.

A 32-year-old woman, with no history of substance abuse, who was not taking any regular medication and whose medical history was unexceptional except for sporadic self-limiting episodes of abdominal pain, requested medical advice for a patchy, non-homogenous green discoloration of the hair, especially of the temporal and occipital areas, that had begun two months earlier. Physical examination was normal; the natural hair colour was blonde. The analytical results included the following: copper in serum: 41 µmol/l (normal range (NR): 11–23 µmol/l); copper in urine: 0.78 µmol/24h (NR: <0.6 µmol/l); ceruloplasmin: 30 mg/dl (NR: 25–40 mg/dl); and copper in hair: 1392 µg/g (NR: 41.7 ± 21.2 µg/g). Microscopic examination of the hair showed some minor alterations of the cuticular layer of the shaft.

The appearance of green hair coincided with a change of domicile. The patient had moved to a dwelling where all the water pipes were made of copper, and a descaler using a method of exchange resins had been incorporated into the household water system. Analysis of the water (pH, 7.2–7.4) from the kitchen and bathroom taps showed the following cation concentrations: copper, 1.2–1.95 mg/l; calcium, 5.8–8.6 mg/l; and magnesium, 3–4 mg/l. The copper concentrations were generally higher in water from the hot-water pipes than from the cold-water pipes. The mains water entering the house had the following cation concentrations: copper, 0.02 mg/l; calcium, 171 mg/l; and magnesium, 58 mg/l. The patient was treated only with shampoo containing D-penicillamine, the descaler was disconnected, and the patient's hair recovered its original colour within two weeks. Three months after disconnection of the descaler, significant changes were found in the cationic concentrations of

the household tap water: copper, 0.5–0.9 mg/l; calcium, 140–160 mg/l; and magnesium, 47–50 mg/l. Over the same period, the concentrations of copper in the blood and urine of the patient fell to 29 µmol/l and 0.27 µmol/l, respectively.

Effects observed in humans following the consumption of water contaminated with copper have been gastrointestinal (vomiting, diarrhoea, nausea, abdominal pain and a metallic taste in the mouth), hepatic (micronodular cirrhosis) and renal (necrosis of tubular cells) (1, 2), and an exogenous pigmentation (green hair) from increased copper in domestic tap water or swimming pool water (3). For the case we have reported on here, the increased copper content was produced by a descaler which drastically reduced the concentrations of calcium and magnesium in the water, thereby converting the water into a corrosive agent which dissolved the copper in the pipes.

Although the concentrations of copper found in the domestic water supply were within those accepted by the Environmental Protection Agency (EPA) (1.3 mg/l) and WHO for drinking-water (2 mg/l, provisional) (4–7), the patient suffered abdominal pains, had green hair, and high concentrations of copper in her blood, urine, and hair. This would seem to indicate the need to revise the legislation regulating permissible copper concentrations in mains water supplies, as already proposed by Sidhu et al. (8), with a view to establishing the maximum permissible concentration of copper at 0.3 mg/l, given that various reports have been published describing chronic copper intoxications due to the ingestion of mains water containing copper concentrations within the limits accepted by both EPA and WHO. ■

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